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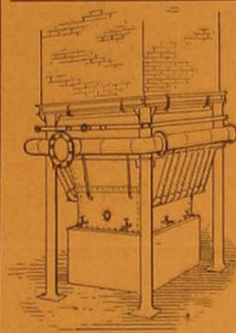
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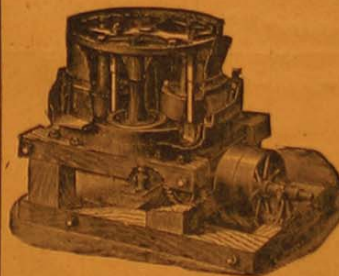
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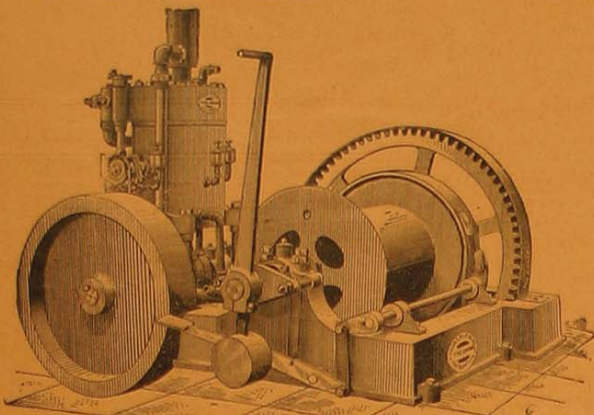
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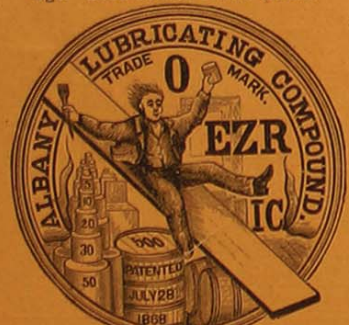
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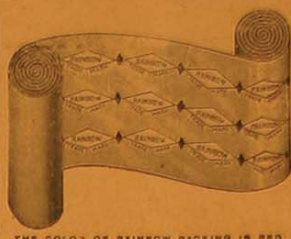
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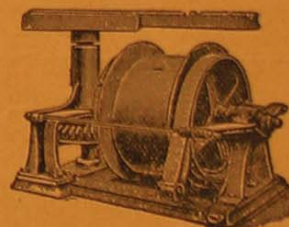
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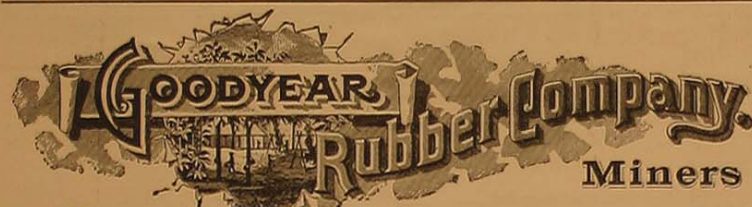
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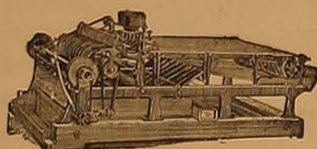
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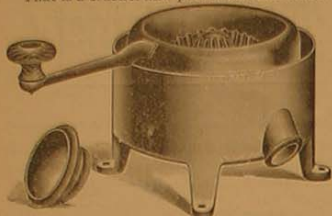
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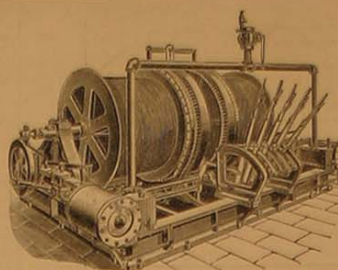
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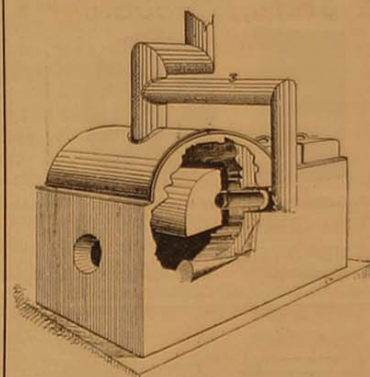
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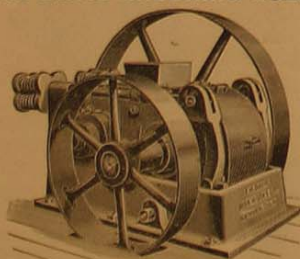
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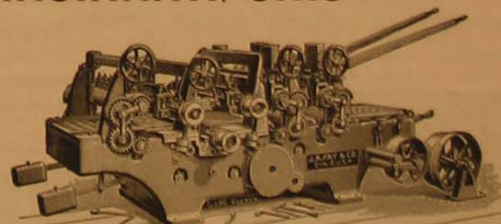
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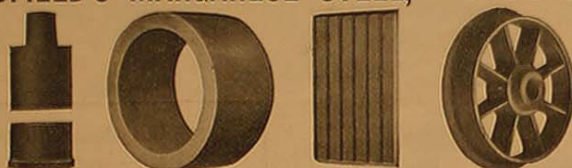
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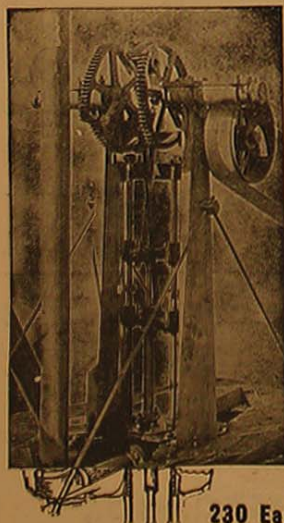
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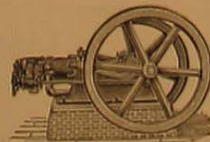
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ISSUED SEMI-MONTHLY

ADVERTISING RATES FURNISHED ON APPLICATION.

In the platforms of the several political parties who have recently held conventions for the purpose of nominating candidates, a great mistake has been made in ignoring the all-important subject of Federal and State Legislation on the question of ways and means for storing and furnishing a large water supply for the dry or arid desert and mountain district of the Southwest. To the mining and agricultural interests of the several States and Territories in the large section involved, no more important social topic is of greater interest to the inhabitants than that of increased water supply to render the country fit for habitation. The question is one of national importance, to follow out the good work already done in this direction by the staff of the Federal Geological Survey, who have surveyed and located sites for large storage reservoirs in the mountains. The work required is so extensive and the interest of the people in it is so important, that large sums of money will be required. Some branches of the work include more than one State and Territory and ought to be done by the Federal Government, while others pertain to one State only and could be accomplished as a State improvement, while those of minor importance could be undertaken by each county or township interested.

Federal and State legislation is required to regulate and control these different enterprises for the benefit of the people. To leave this important work to private enterprise is to neglect a public trust by our political representatives. The colonies of Australia may be taken as an example of how to accomplish and regulate the water supply question, for in these colonies it has been undertaken as a colonial improvement on an extensive scale, beyond the limits of private enterprise. The object aimed at is the storage of the winter rain and snow fall in the mountains and of the summer rain fall in the desert sections, both of which are now allowed to go to waste.

In the event of the discovery of minerals of commercial value, the next move on the part of the prospector ought to be to prove extent and value. The easiest and least expensive manner of proving quantity is by cutting trenches or "costining" across and along the vein or deposit, as the Cornish miners term this operation. This work proves width and length of ore shoots, and these openings may be made one hundred, or fifty or less feet apart, according to the class of ore or deposit opened upon. The next operation involves the proving of value in depth, by sinking a shaft or shafts and driving tunnels where the ground has sufficient elevation to make tunneling a more profitable means of attaining depth than by the more expensive operation of sinking a shaft.

The first fifty feet from the surface down, or the back of the vein, ought not to be worked or stoped out, but should be left as a protection from the weather, and as a support to loose surface wall rock, and to render the future operation of the mine in depth more secure against falls of wall rock. This is a point on which too much stress cannot be put, as it is the prospectors' besetting sin to stoped out surface ore. Many good mines have been made much more expensive to operate from this cause alone, especially where rain fall is heavy, and surface water and ice are caused to drain or gather in the workings. The first level of the mine ought therefore to be not less than fifty, or seventy-five, or, in some cases, one hundred feet from the surface. The surface ore, left untouched in the first fifty or more feet, forms an ore reserve which is easily available when the mine becomes exhausted in depth. It is the safest bank account the prospector can invest his capital and labor in, and one which has never been known to fail or burn up. The first stoping done should consequently be below the first level.

From the beginning of the famous Klondike excitement, when reports were daily received of fabulously rich finds (?) being made in the vicinity of Bonanza and Hunker Creeks, this JOURNAL set forth facts, figures and reasons, too numerous to mention, why there were no chances for prospectors, from this country or elsewhere, of making even enough to pay their way thither, to say nothing of the supplies and outfits necessary for an expedition to that dark and benighted land of snow and ice.

From what miners say, who are returning and have returned to the land of the living, (even those who were fortunate enough to get in ahead of the stampede and secure ground where they could make something) it has been clearly shown that we were right in our views, set forth from the beginning.

In our view, before we could begin to help the people, the herds of wholly unprepared tenderfeet had not rushed blindly ahead, but made a few observations of the country through which they were passing, a great deal of the hardship, misery and starvation would have been averted, and a better showing of gold dust would have been made.

We were not alone, however, in our contentions, as numerous other journals, which had foresight enough to observe what the outcome would be, urged prospectors to look before they leaped, and gave timely advice; among them was the *Alaska Mining Record*, a journal published on the line of travel to the

famous gold fields (?) We take the following from a recent issue of that estimable publication, which we heartily endorse :—

"At last, the word goes forth without challenge that the facts are simply as this paper has long contended, and further that the American side of the boundary line holds far greater promise than ever did the Klondike to the incoming prospector dependent on his individual efforts for a competency, or a mere existence. If these facts can be impressed on those contemplating the journey to the interior, the effect will be to induce them to seek locations upon American soil at once, rather than to stop on the Canadian side, only to be driven by force of circumstance across the line, after their resources have become exhausted. As a matter of fact, there has never been a time when, to the real prospector, the American side did not present greater inducements than did the Canadian, save possibly during the few hours succeeding the Klondike discovery, and preceding the location of the entire available pay ground. Since that time, of the thousands who have rushed on to Dawson but few have succeeded, while of those who have passed down the river the large majority have found no cause for complaint, provided always that their outfits had not been first used up in fruitless endeavors to find open ground on the Canadian side. It is useless to recount the disadvantages under which the prospector on Canadian soil is forced to labor. The limitations, restrictions, taxations and royalties have been discussed fully and freely until they are, or certainly should be, familiar to all, and it is surprising that so many permit themselves to be humbugged into stopping under the load which they are compelled to stagger under there, when the advantages and prospects are so vastly superior in territory over which floats the stars and stripes."

The whole civilized world is reaching out after trade with Phœnician and Rhodian energy. Few countries of Europe are able to support their martial establishments and their people on their own resources. Hence, they are looking abroad to the Americas, Asia, Africa and the islands of the sea, for extension of their commerce and enlargement of its profits.

The increase of mechanical contrivances employed in production enables them to produce at less cost and in greater abundance than in countries where mechanical art is not so highly developed. Increased production conduces to larger consumption, provided the masses possess the means for supplying their wants.

In the United States, there is perhaps the most extensive application of machinery to production, and this added to her many and abundant resources, make her the greatest producing nation in the world. Markets for surplus products are the greatest want of this country, and therefore our people are in rivalry with Europeans for trade in the countries where the mechanical arts are less understood, and where people are unable to supply themselves.

International commerce has reached vast proportions and is increasing with arithmetical velocity, and it is destined to increase in the future more rapidly than ever before.

Consumption is becoming greater through enlargement of production and growth in population. Both are increasing in the United

States more rapidly than in any other nation. Trade and money are subjects to be considered conjointly, they are inseparable.

Money is defined to be a tool of commerce, and, in order to facilitate it, there must be a sufficiency of tools. It is folly to talk about stimulating the increase of manual and mechanical labor in the field of production without first considering whether there are monetary implements with which to supply the means for carrying on industries. Raw materials and labor are not more necessary in the productive industries and in commerce than money with which to pay for them and for labor.

The United States is more fortunately situated than almost any other country, particularly in respect to natural resources, in the variety of soil and climate, which enable our people to produce in wider range and greater abundance, food supplies and raw materials for manufacturers. No people consume as much *per capita* as those of this country, and none possess so much energy and skill in production as Americans. By reason of our varied resources and our ability to produce, and also our immense consumption, we have a volume of domestic trade very much greater than any other country in proportion to population. Increase of our foreign commerce will necessarily add to our volume of domestic trade.

Statesmen, therefore, must devise a system that will supply the monetary needs of our commerce, and failure of this will cause paralysis to seize upon our business energies.

WHY OUR MINES ARE NOT SOLD.

One of the principal reasons that more mining property does not change hands is the unreasonableness of so many owners. Capital is constantly seeking opportunities for investment; but, in a majority of instances, runs up against the snag which overthrows so many possible sales, i. e., the man who has millions in prospective, but only hundreds in sight. Why a capitalist should take any more chances in mining than in any other business proposition is hard to discern, hardly a claim, prospect, or mine is on the market today that is not placed high above its actual value, said a prominent buyer recently. The difficulty arises from the owner's ignorance of a mine's value. The sooner it is understood that claims and prospects are not mines, and even where ore has been developed that investors will not generally pay for more than there is in sight, the sooner will more transfers be made. This leads up to what is termed *ore in sight*, upon which point so many have little idea. Ask some miners what they have in sight? and you will probably meet with the response—that they have a shaft down about 40 feet, and, as close as they can estimate, about 40,000 tons of ore in sight. Now, by what method of calculation this is arrived at is hard to determine. Another will claim to have say, in figures, about \$50,000 worth. Ask him what he will sell for? and he will tell you there is no doubt as to the ore going through to China, and he thinks about \$100,000 would be about the right figure. He gives no consideration to the fact that values contained in ore in a mine and bullion returns are matters to be considered. That it takes money to erect mills, develop water, build roads, etc. In other words, *it takes money to mine.*

While legitimate mining as a rule, pays a better interest on the money invested than

any other business, it is neither just nor right to expect impossibilities.

Oftentimes a mine, from which every available pound of ore has been stoped, will be placed on the market at a high figure, and bullion returns will be shown of past production. As well might a merchant pay a high figure for an empty store, simply because in days gone by it had done a good business. Let the mine owner consider these matters. Let him be truthful of what he has to sell. For the investor will take an accurate account of stock, and if his shelves are not empty, and his price in keeping with what he has to sell, he may dispose of his property.

THE SMELTING VALUE OF ORES.

The small mine owner who has smelting ore or concentrates to sell should bear in mind that it is not always the percentage of metal the ore contains which fixes its value to the furnace owner. The chemical composition of the gangue or rock matter contained in the ore and any objectionable elements it may contain renders a careful and complete chemical analysis of the ore necessary to arrive at its true value. On this account an ore containing say 50 per cent metal may be more valuable to the furnace owner than one containing a higher amount, or say 55 per cent metal, on account of the former possessing constituents which go to form fluxing material. In the smelting districts of the West the mine owners are not accustomed to close figuring on ore values as are the iron ore miners of the East, where competition and freight rates enter largely into the economy of operating a mine. Still the question of smelting value of the ore and its exact chemical composition are a matter of such importance of the mine owner in the West that in his own interests he ought to have a complete analysis of the ore he is shipping. Science in smelting has taken the place of the guess system of operating a furnace of a decade or two ago. For that reason it is incumbent on mine owners to know the chemical composition of their ore so that they may obtain from the furnace man the value the ore contains irrespective of metallic contents. The matter of complete analysis of the ore shipped is one of the small details of the economy of operating the mine which will well repay the careful mine owner.

HELP YOUR MINING DISTRICT.

In visiting some mining districts it is too often a matter of surprise and disgust to a stranger to observe the feeling of envy some mine owners display toward an adjoining mine owner. This is not as it should be in the interests of all concerned, for the prosperity which falls to the lot of one in a district, cannot but help the adjoining mines. A rich strike made in a mine in a district ought to be a matter of congratulation to all and not the cause of jealousy. Man must live in harmony with his environment to make a success, and to make your district prosperous ought to be the policy of every mine owner. In an honest endeavor to speak well and help your neighbor along you are indirectly helping your own cause. Make the welfare of your district second only to your own interests, and do nothing or say nothing which will tend to retard its progress in the presence of strangers.

CUSTOM MILL TAILINGS.

In a recent issue, we referred to the present system of conducting the milling of custom ores. The value or ownership of the tailings was however a point not touched upon, on account of the importance of the subject, and to avoid extending the article to too great a length for one issue. At present, the custom is for the mill owner to fall heir to the tailings, and including any value they may contain, without making any allowance to the miner or owner of the ore for the value so lost for the time being. Recent improvements and the operation of plants and processes for retreating mill tailings make this class of product of special interest and value. If the owner of the ore, who has it milled at a custom mill, desires to retain his right to the tailings, that fact ought to be stipulated at the time of contracting for the crushing or during that period, so that the mill owner can arrange for saving them. In the event of no agreement to that effect, they consequently become the property of the mill owner. This practice is not conducive to saving the closest values for the owner of the ore, as careless milling adds profit to the mill owner in value in tailings, where the ore is not claimed or taken away by the owner of the ore. The question is one in which an agreement as to the disposal of the tailings is involved, as it would be quite impossible for the custom mill owner to save or return them, except at the time of crushing the ore. This is one reason why the mill owner ought to return to the owner of the ore an assay or certificate of the value contained in the tailings, as we mentioned in the former article on this interesting subject to small mine owners who have their ore treated at a custom mill.

We are in receipt of *The Inland Empire*, an extra edition of the *Spokesman Review*, published by the Review Publishing Co., of Spokane, Wash. It is the most elaborately gotten-up edition we have had the honor to receive for some time. Besides giving a fund of information on the north western United States, the publishers have devoted considerable time and expense to gather a voluminous report of the mining industry of the north west. If the matter published in the *Inland Empire*, regarding the mines and mining districts, were published in book form, it would have a ready sale all over the world and would constitute a valuable reference book.

The Edward P. Allis Company of Milwaukee report that the demand for the "New Layner Drill" and the results obtained from every drill sold are so satisfactory and so far ahead of the best results obtainable with the old style piston drill, that mine managers are quick to see the advantages the drill possesses. The following are a few of the plants sold during the last two weeks: Four drill plant to Auburn, Cal.; four-drill plant, Ground & Irwin, Carthage, Mo.; five-drill plant, Inquaran Copper Co., Mexico; two-drill plant, T. J. Steers, Joplin, Mo.; three-drill plant, Swansea Mining Co., Tintic, Utah; four-drill plant, Kerr, Brownlee & Co., Webb City, Mo., and two-drill plant, Chas. Boyd, Aurora, Mo.

This Company is also putting on the market a new hand rock-drill suitable for prospectors and leasers, to be used where power is not available and judging from the number of inquiries received, the Allis Co. expect to do a large business in this particular branch.

SIERRA MOJADA.

The famous camp of Sierra Mojada is located about 76 miles east of the station of Escalon on the Mexican Central Railroad.

The mines are connected with the Central Railway by a standard gauge road which passes over an almost level and desert country and there is no water on the line except that which is caught in dams and stored up for the use of the railroad. They are obliged to haul the water for the use of the employees on the line of the road.

The road also passes through a great salt lake at which hundreds of tons of salt are stored which is shipped to different parts of the country for mining purposes.

The mines of Sierra Mojada are in some respects similar to those of Mapimi, but different materially in other respects. They are situated along and near the base of a perpendicular mountain which lies a few hundred feet back of the mines, and in a valley some

ore toward the valley the mineral seems to give out. Probably at this point it was broken by the upheaval. It is believed it will yet be found beneath these mines lying horizontal. It was evidently deposited horizontally and afterwards covered up with the wash of the conglomerate sandstone and other matter.

This conglomerate and stone which overlies the mineral is from 200 to 2,500 feet thick and it is also found that the lime stone forms the bed of the mineral deposit. The mines are developed along the base of the mountain for a distance of about two and a half miles. The ores are practically the same and so far as developed all dip toward the valley at about the same degree. There have been a good many millions in value taken from this camp.

There was at one time a smelter erected here, but for some cause or other, it did not seem satisfactory or at least it is not running at the present time.

The railroad is owned by a company which

wealth and will continue to produce handsomely, for years to come. There are two mining towns about two miles apart.

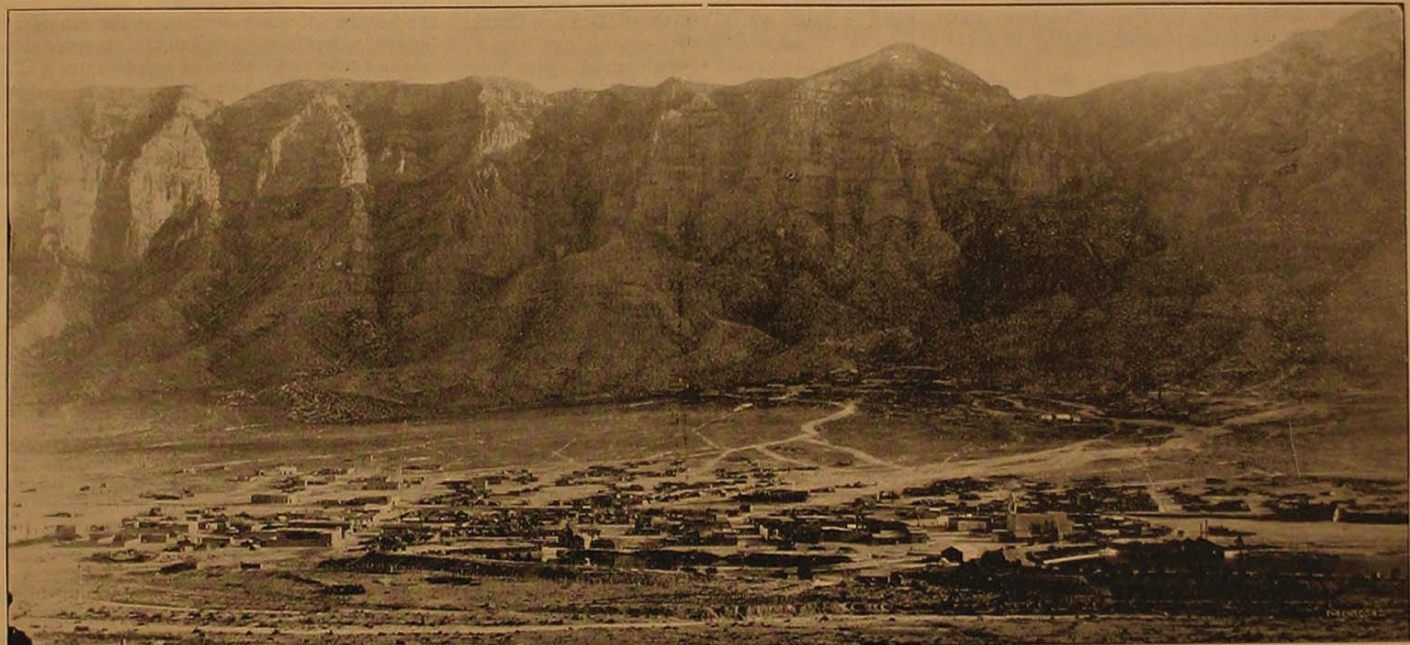
Water is very scarce there, which fact belies the name of the place, there being some wells only at the lower camp near the center of the valley below. The mines are very dry and have to be timbered very carefully as the hanging wall is broken and loose and caves very easily.

They are shipping from 20 to 25 cars of ore daily. The principal mines are owned by different companies and are worked on a large scale.

The climate is very hot and dry and the railroad is very dirty and affords no accommodation for passengers.

The Parrot Company.

The Parrot Copper and Silver Mining Company Sept. 12th declared a dividend amounting to \$69,000 and making a grand total of dividends paid by the company \$2,069,898.



SIERRA MOJADA (WET MOUNTAINS)

two and a half miles in width with low rolling hills on the east of the valley.

The general formation is blue limestone the same age and grade as that of Mapimi. The ores as a rule are rather low grade, though they have taken out a great deal of ore ranging from 50 to 70 ounces to the ton in silver. They are carbonate ores and not very base and are good smelting ores. The peculiarity of this formation is that the foot wall is of limestone and that the hanging wall is of a coarse grade of conglomerate sandstone with a reddish color. The deposit pitches toward the valley. There have been no strata of ore found as yet in the lime stone. The vein matter and the hanging wall appear to be very much shattered and broken up by the upheaval and a portion of the foot wall is shattered more or less, and in some cases they find very good ore in the lime stone in the shape of chloride of silver particularly where the lime stone has been more or less shattered by the upheaval. It appears that after going down a considerable distance, following the

has a monopoly on all the freight. Their charges for switching and hauling the ores 76 miles to the junction with the Mexican Central road is \$8.25 per ton. This cost prohibits the shipment of great bodies of low grade ores which could be shipped out with a profit if they could obtain a reasonable rate of freight.

The mines are not now doing nearly as well as they have done in previous years but further developments will undoubtedly open up large bodies of ore in the camp and perhaps richer ores than have been taken out will be encountered, especially if they can find the deposit where it lies horizontal or nearly so. The raising and breaking up of a deposit of ore has a tendency to impoverish it as it gives the surface water a place to penetrate the deposit which is liable to dissolve a great deal of the mineral in solution, especially the silver which is chemically compounded with the lead.

It is certainly a very interesting mining district. It has produced a great amount of

The mines of the company are in excellent condition, the old reliable Parrot still continuing to keep up its steady output without appreciably diminishing its ore reserves. The Bellona shaft has now reached a depth of 400 feet and is said to have great promise of becoming one of the great producers of the copper district.

It may be of interest to engineers and steam users in general to know that the world's greatest battleship, "The Oregon," which made a run of 13,000 continuous miles and went into action at Santiago de Cuba (a whole fleet in herself) without having to undergo any repairs, was fitted in all her joints with Rainbow packing, Eclipse gaskets, and piston and valve rods packed with Peerless packing, manufactured by the Peerless Rubber Manufacturing Co., of No. 16 Warren street, New York. A good lithograph of the Oregon 14"x20", can be had by any engineer upon application to the above firm.

A GRAND ENTERPRISE.

The Basic Company, a Philadelphia organization, having for its object the purchase and exploitation of tracts of auriferous gravel land that will pay to operate with dredges and which has already floated two companies in the Boise Basin of Idaho for this purpose, to wit: the Bed Rock Dredging Company at Placerville, and the Boise Dredging Company at Centreville, has been engaged during the past season under my superintendence in the installation of a water power plant on Grimes Creek, (which is the central stream of Boise Basin) to furnish electrically the power needed by the two dredging companies already organized and others contemplated in the vicinity.

The company has secured enough desirable territory to provide operative field for eight to ten modern elevator bucket machines built on the general plan (with, however, some great improvements) of those which have been successfully in operation for two years past at Bannack, Montana. Mr. S. S. Harper, the designer of one of the Bannack dredges, is the general manager of the Basic Company and of the two subsidiary companies just mentioned.

Boise Basin is a depression in the mountain mass between the valleys of the Boise and Payette rivers in southern Idaho, some twenty to twenty-five miles in diameter. Its average altitude in central parts may be stated at 4000 feet and on the rim at 8000 feet. The towns are Idaho City, Pioneerville, Centreville, Placerville and Quartzburg.

Perhaps in all the Rocky Mountain region no equal area has been so productive of placer gold as this. The flush years were from 1863 to 1870. In that period the yield was considerably over \$100,000,000, while up to date it may be fairly stated at nearly \$200,000,000. Gold was found not only in the channels of the streams but also in the soil on the low divides between them, and these latter were often so rich, so easily placed under water and so well furnished with dumpage facilities that they constituted a favorite field for mining.

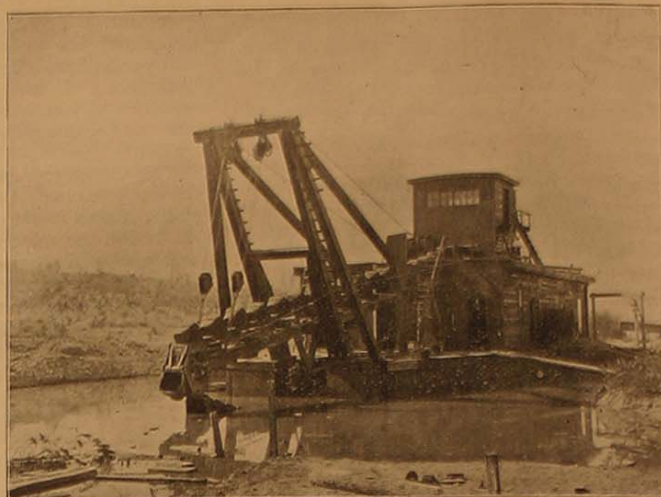
Thousands of acres were sluiced away. As a consequence, the main creek channels at a very early period in the history of the district were buried in tailings to the depth of ten to forty feet, so that the rich gravel in their beds could not be worked. These furnish now the field for the dredge. The tailings themselves, it is thought, will at least pay for the expense of rehandling, while the unworked deposits below, it is known, constitute a source of wealth that has for a long time been overlooked.

The problems presented in the improvement of the water power of Grimes Creek may be stated as follows:

During the period of high water, from May 15th to June 15th, the stream carries at times as much as 20,000 inches of water, while in the term between August 15th and September 15th, the volume falls to 1500 to 2000 inches and perhaps as much as one-third of this travels on the bed rock. Centreville is located on Grimes creek and near the centre of Boise Basin. For a distance of six miles above and below the town the creek has a fall ranging from 20 to 25 feet per mile. Below it enters into a canyon where the grade ranges from 50 to 80 feet per mile. In the twelve miles of comparatively flat valley the original channel of the stream is buried under debris from the bars on all sides to a depth from ten to forty feet, in accordance with the topographical features at each point, and whereas the original valley was not over 200 to 400 feet in width it is now in places 700 to 1200 feet wide, the deposits of tailings covering even the low bars on both sides. It is evident, therefore, that in the spring especially, and to some extent all the year round, the water of Grimes creek is turbid and full of debris in suspension, which is ready to be deposited at the slightest opportunity afforded by a decreased grade.

The canal just completed commences about six miles below Centreville, where Grimes creek leaves the Basin, and has a total length of 43,868 feet, terminating at a point about six miles below on the mountain side at a vertical elevation of about 350 feet above the stream. It is constructed on the eastern wall of the canyon which, in its upper part, is very steep and high, and in its lower part is cut by deep canyons coming in from the side, which add very materially to the necessary length of the canal.

Of the total length mentioned, 15,765½ feet are ditch and 28,102½ are flume. Of the latter measurement 1977 feet are on trestle work, and 163½ feet are in a tunnel. In accordance with topographical features encountered, sections of ditch and flume alternate from start to finish. The ditch is of uniform dimensions throughout, having a width at



BASIC CO.'S DREDGE, PLACERVILLE, IDAHO.

the bottom of sixty inches, at the top of 135 inches, a depth of 36 inches and its sides slope to the surface at a ratio of one to one. The grade is 5.28 feet to the mile.

The flume is of two sections, the large section having an inside width of 54" and a depth of 27", and the small section a width of 48" and a depth also of 27". Where the small section is used it is given a grade of 10.27 feet to the mile. The large section has the same grade as the ditch.

The tunnel is five feet in width at the bottom, four feet at the top and 6½ feet high, all these dimensions being inside of timbers.

The trestles are all of single deck work, the highest bent not exceeding 25 feet and the uniform span between bents being twelve feet.

A shelf seven feet in width of solid ground was cut out of the mountain side for the flume and this excavation in many places ran into bedrock and made blasting necessary. It was found that the average excavation, per running foot, of this grade was 17½ cubic feet. The total excavation, exclusive of the tunnel, was 95,648 cubic yards.

The work began on April 21st and terminated August 19th, thus consuming 121 days for its execution. As the enterprise was carried on in an uninhabited part of the country, about fourteen miles of road had to be built to enable material and supplies to be carried in and shelter provided for the men engaged. During June and July, which was the most active period, nearly 175 men were employed.

The mountain slope upon which the canal was built was so uniformly steep that it was only possible to do 16½ days' work with one team with the plow and scraper; all the rest of the excavation was by pick, shovel and drill.

In the construction of the flume 776,900 feet of lumber, board measure, were used. This includes wastage and a stock of about 10,000 feet still on hand at various parts of the structure for repair, when necessary; 24,700 pounds of nails were consumed, together with about 100 pounds of tacks and \$100 worth of muslin for the end joints of each 12-foot section.

The style of flume built is shown by the accompanying tracing. As the grade was prepared, two continuous stringers of 2x8" were laid and upon these the sill and posts (previously framed) were set. The timber



BASIC CO.'S POWER HOUSE AND PIPE LINE, CENTREVILLE, IDAHO.



SECTION OF FLUME ON BASIC CO.'S CANAL, CENTREVILLE, IDAHO.

Excavation, covering labor, coal, blasting powder, steel consumed, superintendence, depreciation and loss of tools, work, and the grubbing out of timber along the line, averaged a little less than twenty cents per cubic yard. As the route was quite heavily timbered and so steep that the surveying in places was a matter of considerable danger, it is believed this figure is unusually low and reflects great credit on Mr. Alexander Kerr, of Placerville, the foreman in charge of the grading crew.

The construction work, which covered all carpentering, la-

delivered at the point where it was placed in position, averaged 29 cents per linear foot of flume constructed.

The consumption of nails was a shade under a pound per linear foot, was $12\frac{1}{2}$ cents and of the ditch excavation, including everything necessary to permit the water to pass, was $94\frac{1}{2}$ cents.

The total cost of the flume constructed and in operation, per linear foot, and excluding bridge and trestle work carrying it over ravines, was ninety cents per running foot.

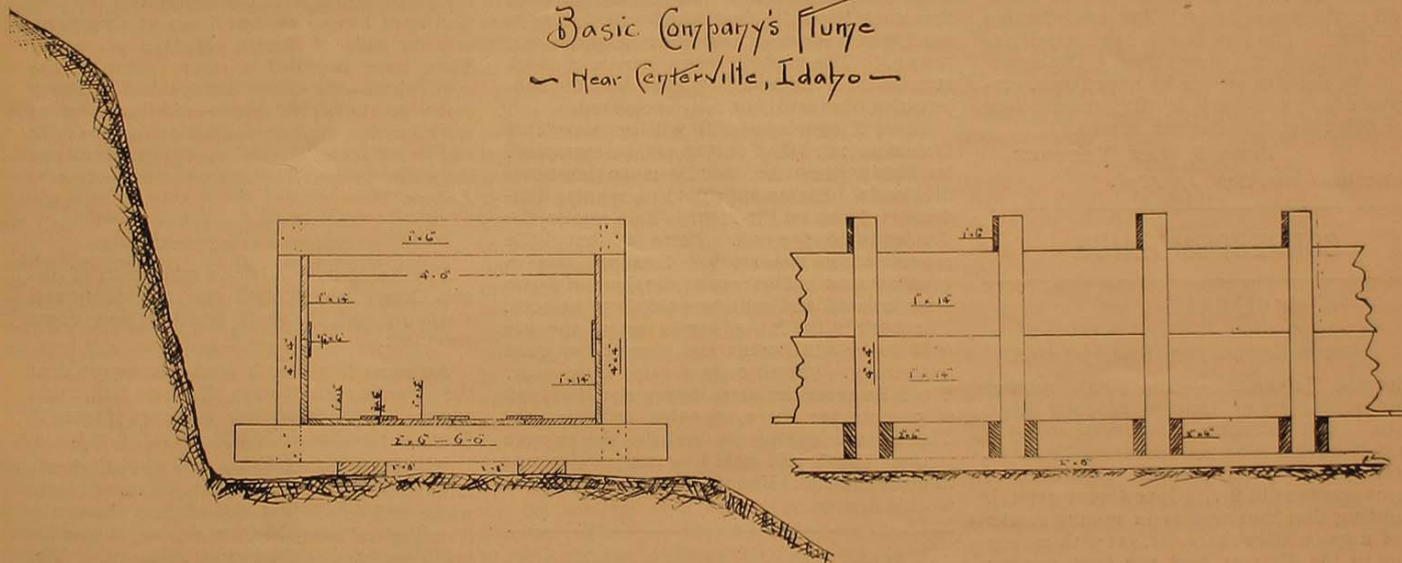
The general field management of the work was in the hands of Mr. Robert Dunn, of Montana, and to his executive ability and treatment of associates and men, was largely due the rapid, thorough execution of the work.

The scale of wages was as follows: Boys employed in passing lumber, \$2 per day; all other labor, \$3, including all the grading crew and two thirds of the construction crew; blacksmiths and carpenters, \$3.50. A few carpenters of extra ability and experience in constructing and raising trestles were paid \$4.

The lumber delivered afloat in the canal cost \$10.64 per thousand feet, board measure.

The engineering and surveying was in the

Basic Company's Flume — Near Centerville, Idaho —



used was cut all in the immediate vicinity. It has the reputation of standing (in contact with water and earth) for 15 to 20 years before showing much decay.

The lumber was delivered at an advantageous point near the head of the canal and was at first transported in the completed ditch and flume on cars travelling upon wooden rails made of 2×4 " scantling, but as soon as sufficient of the canal was constructed water was turned in at the head and from that time on the lumber was floated during the night and early morning to the nearest possible point at which construction was in progress and there piled up along the flume side to be carried forward in cars to the carpenters. As the work progressed, boys were employed with poles to keep the lumber moving until at the latter end of the work nearly fifteen were engaged in this occupation and six to eight hours were required to transport a stick from the head of the ditch to its foot. Nails were also carried to the workmen in the same way on floats. It was not found possible at any reasonable cost to build a road to any part of the canal, excepting near its head.

The details of cost have proved as follows:

bor, superintendence, and the wear and loss of tools furnished by the company, amounted to $44\frac{1}{2}$ cts. per foot. It was under the immediate supervision of Mr. Chase Wilson, of Placerville, a flume-builder who is well known for his capability in this part of the west.

The consumption of lumber, per running foot, including waste, running board on the top, pressure-box and appurtenances, and a telephone pole line on 2×4 " scantling for some of the distance, amounted to $27\frac{1}{2}$ ft., board measure, and the cost of the lumber



SECTION OF DITCH ON BASIC CO.'S CANAL, CENTREVILLE, IDAHO.

hands of Mr. James M. Morrison, assisted by Mr. M. H. Bedolfe, both civil engineers of the northwest, and the satisfactory way in which the water travels in the canal is an evidence that their work has been carefully performed.

These figures of cost do not include the dam at the head of the canal, but do include a double flume 100 feet in length just below the dam, which has for its object the separation of the suspended gravel which Grimes creek carries. This device has so far worked very satisfactorily, and if it is found that it answers all requirements during a full season I may feel like describing it to your readers.

After being deprived of the bulk of this suspended gravel and sand, the water contains considerable slime or sludge, which does not appear to interfere in any way with its working capacity on the wheel nor damage the latter, and which has been found capable of rendering the flume and ditch perfectly water tight in a few hours.

From the pressure box at the end of the canal, the water is conducted through a steel pipe having a diameter at first of 26 inches, coming down gradually to 22 inches, and from thence through a short reducer to 15 inches, from which it is lead through a cast iron nozzle piece in two jets to the Pelton water wheel in the power house. The total effective is 347 feet. The pipe is laid upon a uniform grade and is about 730 feet long. The capacity of the canal as proven by experience, corresponds to the delivery at the pressure box of 40 cubic feet of water per second.

THEO. F. VAN WAGENEN.

Centerville, Idaho, Sept. 24, 1898.

CORRESPONDENCE

UTAH.

SALT LAKE CITY, Sept. 30, 1898.

EDITOR JOURNAL:—The Utah mining share market grows broader as each week passes. The sentiment is becoming stronger that this market is an excellent one from an operator's standpoint, and the high interest returns continue to invite investment capital. Admitting that investments in mining stocks are of a speculative character, yet with money ruling in the East at four per cent, mining stocks that give returns of 20 per cent are undoubtedly attractive. I doubt greatly if the standard mining shares on this market will show wider fluctuations from one year's end to another than the industrial and railroad securities handled on the New York Stock Exchange, and the returns on the mining shares are fourfold greater.

Ajax is being quietly picked up. Anchor was in slight demand. Bullion-Beck continues to sag and but little interest is being given to quotations. Centennial-Eureka was uneventful. There is nothing new to report on Chloride Point. The passivity stockholders have displayed deserves a high reward for patience in awaiting returns.

Daisy was the heaviest seller of the week, and bids fair to prove a prime favorite. The sentiment, locally, in regard to the mine is entirely favorable. The developments continue to disclose vast bodies of good grade ore, and the mill is doing good close work. Dalton & Lark are increasing the force at the mine and some good ore is being shipped. Daly holds steady. Daly West continues to be offered. Dexter carried out my predictions of last week and advanced strongly. There is much bull talk about higher prices

to be recorded for this stock in the future. Eagle was stronger. It is stated that a good block of treasury stock has been placed.

Four Aces advanced a trifle on the report that Airis of the Mercur company had obtained control, and will push developments on an extensive scale. Galena advanced on small lot buying. The assessment of 10 cents per share becomes delinquent October 13th. Geyser-Marion eased off a trifle. The stock is being absorbed by people who believe in the future of the mine. Grand Central was strong around \$7. It was bought heavily by an insider. Horn Silver declared its quarterly dividend of 5 cents per share, or \$20,000, payable September 30th. Lower Mammoth shows elements of strength and weakness by turns.

Mammoth partly recovered its loss due to the passing of the September dividend. This was accounted for by the favorable showing on the 1700 foot level and the authorized statement that an option at \$2.50 per share had been given on the control. There is no stock on the list that has the mercurial qualities of the Mammoth. The Mercur management announce that the present mill's capacity will be increased from 300 to 400 tons per day. This action has been impatiently awaited for some time, and while it has not strengthened the stock as yet, it should and will. Northern Light was weak and low. Ontario was strong. The market seems barren of stock at reasonable figures. Omaha was the subject of a bear raid, but fully recovered.

Silver King's new mill will be completed December 1st. The output will be increased, but this does not necessarily mean increased dividends. Sacramento paid its regular dividend of \$5000 on the 28th. This carries the dividends to \$57,000. There is but little movement in the stock. Swansea was in good demand. The regular dividend of \$5000 was declared and will be paid October 10th. The work in the lowest levels prove the ore vein to be continuous and going down good and strong. Swansea is a great little mine. South Swansea declared its regular dividend of 5 cents per share, payable October 4th. The mine is looking fine and the shares were strong. Utah just held its own. Valeo was in good demand. Young America sold at last week's figures.

Miscellaneous Mining News.

ALASKA.

At Sunrise city, Cook Inlet, on California Creek, there are ten men working, doing fairly well.

On Cow Creek, Williamson & Co. are putting in hydraulic machinery. They have ten men at work, and the ground averages 50 cents to the cubic yard.

Beedy Bros. have sold their Bear Creek hydraulic plant and mine to Mr. Sleeper of New York for \$15,000.

O. Riley, the discoverer of Bear Creek placers, takes out all the way from \$10 upwards a day to the man and employs three men.

Highway Robbery on the Dalton Trail.

It is not an uncommon occurrence for miners and prospectors coming out from Dawson over the Dalton Trail to be held up, and their hard-earned (very hard earned) savings swept away, just when they are looking forward to brighter days. Only the 18th of September, two miners, named A. H. Frazier and E. L.

Tollmer, were held up by highwaymen, at a point about 60 miles from Haines Mission, and forced to surrender \$2,600 in dust and currency. Another miner, Ike Martin, had a similar experience last week, and has not been heard from since he was reported to have started back to notify the police, and it is feared that he has been murdered.

ARIZONA.

Work began last week on the great stack designed to carry off the smoke from the furnaces at the United Verde works at Jerome. The stack is twenty-five feet in diameter at the base, and is to be 158 feet high. The smoke will hardly settle around the works after being carried to that height. Improvement upon improvement is being made and will continue to be made until Jerome is the greatest copper producing camp in the world.

CALIFORNIA.

AMADOR COUNTY.

The Kennedy people at Jackson are making preparations which will preclude the possibility of having to shut down at that property in case of future shortage of water. They have installed a steam plant at the north shaft—they have always had a steam plant at the south shaft—and are now at work putting engines and boilers in the mill, and in a few weeks will be equipped to run the entire property by steam power.—*Amador Ledger*.

CALAVERAS COUNTY.

The Nellie mine, about a mile south of Angels Camp, has installed new machinery and started to sink the shaft, which is now down sixty feet.

An exceedingly rich strike is reported at the Harris mine near Carson Hill, this county. Ore estimated at from \$1500 to \$2000 is reported to have been taken out.

The work of cleaning out the Lightner mine and freeing it from the mass of slush, water and debris that flowed into the works from the end near the Potter mine, is now being prosecuted with all possible haste. The interior of the mine was considerably damaged by the gouge slide, but the management is of the opinion that the mine will be in running shape before the rains set in.

EL DORADO COUNTY.

John Melton is constructing a fifteen-stamp mill on the mining property he is operating north of the Gentle Annie mine. The stamps are from the Rosencranz mine, near Garden Valley, and five were brought from the Bell mine, one of the properties owned by Mr. Melton in the Poverty Point group. This machinery will be erected on the Baltic mine, which lies considerably north of the Gentle Annie, toward the river. A tunnel is being extended into the Poverty Point mine, south of the Baltic, to tap an ore body about 600 feet deep on which a shaft has been sunk.

INYO COUNTY.

Robert F. Harrison, superintendent of the Rose mine, and Mr. Llewellyn, of Los Angeles, have taken a bond on the Radcliffe mine in Pleasant Canon, in the Panamint mountains, for 50 days. They have paid \$2000 down and have shipped machinery to work it.

KERN COUNTY.

A rich find has been made back of Garlock in the Little Mesquite Canon about two and a half miles distant from town. George P. Brady, the blacksmith, and his cousin F. C. Parsons, but recently arrived from Oakland, are the lucky fellows. The ore is very rich, specimens shown on the streets are literally plastered with gold. The rich quartz seems to be attached to the slate. The ledge is only about ten inches but so little work has been done that it is not yet known what it is in thickness.

SAN BERNARDINO COUNTY

The State Range Mining District is San Bernardiño county, is attracting more attention than ever. A great many mining men are fitting out for that section, while teams are seen on the road loaded with supplies going to that locality.

Barstow seems to be considerable of a mining center, as much so as other more noted localities. Being a railway junction, the town has a bustling appearance. Hotels and restaurants are doing a thriving business. The town is tributary to new mining fields north that are very likely sooner or later to be tapped by a railroad.

Messrs. Cramer and Schultz, two Los Angeles prospectors have discovered and located a vein of coal in Cajon Pass, eighteen miles from San Bernardino. The coal is of the soft variety, and the finders claim to have traced a vein six feet wide at the top and extending for 1500 feet. The Santa Fe railroad officials saw a sample of the coal and are interested in the developments. If the indications count for anything, a great coal field exists in San Bernardino County, the development of which will make it one of the great industries of the state.—*San Bernardino Transcript*.

SISKIYOU COUNTY.

William Angle and Jordan Brown, are developing a very rich discovery recently made by themselves on Sterling Mountain, near the Oregon line. The ledge has been uncovered for a considerable distance and is of porphyry formation and about 20 feet in width, with a pay streak running from 4 inches to 2 feet in width, they say.

The find is in a section rich in gold deposits. Adjoining it is a placer claim, which has been worked by hand work with a very limited water supply for a number of years, and has paid well during the short season it has been possible to operate it each summer.

TUOLUMNE COUNTY.

The Duloop and Dewey mines in the Groveland district, owned by J. E. Summers, F. M. Cook and Tarry White, are being worked. The former has been worked to a depth of 40 feet, at which point the vein is 8 feet wide. The Dewey has been bonded to parties who will soon commence active operations. This mine, though a mere prospect, is expected to develop into a good property.—*Union Democrat*.

Rapid work is being done on the new hoist at the Mazeppa, and everything was up and running by the 10th of September. On that date sinking, which was discontinued some time since to permit the equipment being placed in position, was resumed, and there is a big vein and plenty of rich ore in sight in the bottom of the 76-foot shaft. The hoist is

of forty horse power, as good as money can buy and of similar pattern to those on the Alameda and Tarantula mines. The boiler is sixty horse power.

COLORADO.

Tellurium ore has been struck in the Schultz Wonder below Apex, Gilpin county. It was found in driving a tunnel which is now in from its entrance 600 feet and which cuts the vein at a vertical depth of 300 feet. The ore is said to assay \$2,000 per ton. A shipment will shortly be made which will give more fully the exact value of the ore.

More Luck for Stratton.

It is more difficult to obtain information concerning the condition of W. S. Stratton's mines than any others in Cripple Creek, for he hates newspaper notoriety. But from general gossip it is gathered that this lucky miner has struck it again, this time in the John A. Logan. A level was run from the 150-foot station to cut the Gold Sovereign vein, and it is reported a body of ore has been encountered in this drift which is six feet wide and worth \$60 to the ton. A shipment has been made from the strike and large ore bins are being erected, which warrants the belief that the strike is a genuine one and bids fair to last.

A Grand Strike.

The discovery of ore in the Chaffee-Notaway, Russell Gulch, Gilpin county, is nothing short of a wonder, and it has produced a wild sort of a sensation (for this section) among mining men. A shipment of a small lot last week returned 344 ounces to the ton, or nearly \$7,000. The lessees claim to have four tons of ore of equal value to this. The ore is a sylvanite unlike almost any other ever found in this county, and it is peculiar because so unlike any other mine in the immediate neighborhood. Several shipments of ton lots have been made which run \$1,000, and it is said to be the most flattering strike ever made in Gilpin county. The streak from which the ore comes is of good size and shows fine gold as well as sylvanite and comes from a level at the depth of 140 feet. Shipments for the coming week are expected to reach \$20,000. The lessees were all poor men prior to making the strike, and they are more stunned by their stroke of luck than anybody else. The mine is owned in part by the wife of Ulysses S. Grant, nee Miss Chaffee.—*Mining Reporter*.

Cripple Creek Items.

During the month of September, the output from the Cripple Creek district amounted to \$1,441,520. It will be readily seen by these figures that Cripple Creek is not only holding its own but making a gradual increase and that the past month, as well as the past week, must have been a busy one among the shippers.

Following are a few from among the many shipments made during the last week and month.

RAVEN.

An unusually heavy production was made from the Raven mine last week. Of late it has been running at from 50 to 60 tons every seven days, but the last report from the property is 150 tons. The ore was of various grades.

MONUMENT.

Large shipments of high grade ore con-

tinue to be sent out from the Monument mine on Battle Mountain. During the past month a total of over 177 tons, with an average of \$57.40, was sent out in nine carloads as follows:

44,780 pounds, at \$52.40 per ton.
43,417 pounds, at \$93.80 per ton.
31,785 pounds, at \$72.20 per ton.
45,916 pounds, at \$31.80 per ton.
28,997 pounds, at \$56.60 per ton.
49,340 pounds, at \$36.60 per ton.
21,915 pounds, at \$67.90 per ton.
33,163 pounds, at \$48.80 per ton.
55,913 pounds, at \$58.30 per ton.

The property, which is about two acres in extent and is located between the Portland and Granite mines, is being operated under lease by E. Everett. It is owned by a local syndicate as follows: E. Everett, Ira Williams, W. H. Evans, Mrs. E. E. McGovney, E. C. Bale, V. Z. Reed and A. F. Woodward.

GEORGIA.

The Cherokee Ocher and Barytes Company has just completed the erection of a large plant for manufacturing and preparing ocher for market on its property, near Cartersville, Barstow Co. The deposit is very extensive.

The Halloysite mine, near Butler, Taylor Co., has been sold by J. C. Lamb to Earl Sloan, of Charleston, S. C. The mine, it is said, has contracts to furnish 100 tons a day to paper-makers.—*Engineering and Mining Journal*.

IDAHO.

Coeur d'Alene Notes.

The Lucky Boy company will soon put up three two stamp mills, equal in crushing capacity to the ordinary 10-stamp mill. They will run a pipe line from Lager Beer gulch to convey water to the mill. A force of men were put to work last week grading and digging a cut for the pipe line.

The lower tunnel of the Colwyn was in 150 feet last week.

Each bit of fresh intelligence from the Father lode is to the effect that it continues to improve.

The big mill level tunnel on the Bunker Hill and Sullivan is now going in a little over 10 feet a day.

The Amazon has shown a decided improvement with the work recently done on it. A couple of men will be employed there for a week or two yet and possibly longer.

MICHIGAN.

One of the most important copper mining properties in Ontonagon county has just passed into the control of Hon. T. B. Dunstan of Ishpeming. It embraces the Adventure, Hilton and Knowlton properties which lie in the vicinity of Greenland, and will henceforth be known as "The Adventure Consolidated Copper Company." The Adventure comprises 780 acres, the Hilton 320 acres and are continuous properties, and the Knowlton 406 acres, about a mile distant, all being on the mineral range. Besides this large area Mr. Dunstan has also secured the surface right to 200 acres of other land in the vicinity which it may be found advantageous to use at some time in the future.

MINNESOTA.

The Pioneer Mine.

At the Pioneer mine Vermilion Range, they are taking out the water, preparatory to active underground operations. They are employing two bailers, which are 3' 8" x 5' x 13" long, each having a capacity of 1600 gallons. They are V-shaped at bottom, to permit of ready entrance into the water and to force aside obstructions. The outlet valve is attached by chain to one end of a lever at top of bailer while the other end, as bailer is hoisted, strikes a heavy block constructed so as to be movable vertically. This opens the outlet. The load on the rope is ten tons, but the engines are operated in balance so that steam is only used to hoist water and a portion of the rope. A bailer of water is delivered at surface every 1 1/4 minutes from a depth of 600 feet. In addition to the bailers there are small pumps on the seventh level throwing water to pump on third, and that lifting it to surface. A big Prescott compound pump will soon be placed on the seventh level. To supply pump on seventh level they are using the Pohle air lift. It is simply a 6-inch pipe open at bottom, dropped into the water with a 2-inch pipe dropped down inside. Compressed air is sent through the smaller and is discharged underneath, the buoyancy of air throwing up a large stream of water. It is simple, effective and requires no packing or attention.—*Ishpenning Iron Ore.*

MISSOURI.

On the Leonard land, in Chitwood Hollow, H. C. Stutton & Co. have a rich prospect. At 75 ft. they went into ore, and in one shaft they took out of a small drift 8 tons of high grade zinc ore. The ore was carried out in boulders, hoisted and put into the bins without washing. There was no water, and they do not need any at present. The strike is one of the richest made in Joplin for a long time.

MONTANA.

Articles of incorporation of the Johnstown Mining company have been filed with the secretary of state and the county clerk of Silver Bow county. The company is organized under the laws of the state of New York with a capital stock of \$100,000, and the properties to be operated are located in the Butte district. The company is ostensibly formed to operate a number of mining claims now held under option by the Heinze brothers of the M. O. P. company. Options on a number of very promising, partially developed mining claims in this district will be turned over to the company, and it is reasonable to expect that another producing copper company will be the outcome. Carlos Warfield is the Montana agent.—*Western Mining World.*

The Ben Bolt, which is owned by the Mount Helena Mining & Investment company of which Maj. James Shoemaker is president, L. W. Heath secretary, and F. W. Thomas manager, shipped half a car from the property, which is situated in McClellan gulch, during the past week. The shaft has been sunk 80 feet and drifting has progressed 50 feet. The ore shipped was stoped out and five or six carloads are now ready to stope. The ore is sulphuret and runs in the neighborhood of \$30.

NEVADA.

New Smelting Plant.

The machinery for a water jacket furnace has arrived at the Union switch on the E. & P. railroad in Pine Valley. It is to be used in the copper properties until recently owned by T. R. Whelan and J. B. Dougherty, situated in the Copper Basin, about twelve miles north of Mineral Hill. The mines are said to have been sold to California people, who propose entering upon active development work at once. They are believed to be located just over the line in Elko County, but the place selected for the erection of the furnace will probably be in Eureka County. The furnace is the latest improved water jacket pattern, and has a capacity of 90 tons in 24 hours. The machinery so far received, weighing 32,000 pounds, is said to have cost \$10,000. Two experienced machinists are on the ground and will superintend the erection of the plant.

NEW MEXICO.

Output Hillsboro Mins.

Output of Hillsboro gold mines for the week ending Thursday, Sept. 29th, 1898, as reported for *The Advocate*:

	TONS
Wicks.....	25
K. K.....	20
Richmond.....	35
Snake Group.....	65
Opportunity.....	25
Sherman.....	5
Cincinnati.....	20
Trippe.....	75
Rex (silver-lead).....	10

Total..... 280

Total output since January 1, 1898—6,310.

OREGON.

Southern Oregon Mines.

At Mt. Reuben, Josephine county, Senator Jones, of Nevada, has 80 men developing a promising quartz ledge, and on Grave creek, near by, miles and miles of new hydraulic pipe is being put in to carry water for washing placer mines as soon as the fall rains set in.

On the Althouse, near the California line, where thousands of miners made fortunes 40 years ago, new and extensive plants have been set up to extract the gold by modern methods.

At Ashland, four rich ledges are being worked, and these all prove that Southern Oregon quartz mines are not mere "pockets" as has been supposed.

Fay, Taylor & Co., whose mine is located on Powell creek, report having their ditch completed, and also the new house to replace the burnt cabin.

SOUTH DAKOTA.

Black Hills Notes.

A well has been sunk to bed-rock at the Pluma Chlorination Works to furnish more water. A tunnel extends across the gulch and the well is sunk midway across.

Burns & Little are making preparations to commence work on their property in Garden City camp. They own several claims, all of which show good bodies of ore. They will furnish the new cyanide plant with ore.

A remarkably rich strike of free-milling ore was made on Victoria creek, about 12 miles southeast of Rapid City. A rancher named Henry Muescamp sunk a shaft 25 feet, the last ten feet being in bedrock. At that depth he struck rock which is very rich with free gold.

The Alexander-Dotson cyanide plant will be ready to receive ore about the first of the month. When the work was commenced on the plant, it was estimated that two months would be required to place it in running order. The work has progressed very satisfactorily and it will be running about as soon as was expected.—*Black Hills Mining Review.*

UTAH.

Of the Utah mines, we find the outlook very bright. Ajax, of Mammoth, is steadily pushing development, and expectations run high at the present time.

There is a report current that the Alliance, of Park City, will resume operations. A comfortable sum of money is in the treasury of the company and can be utilized for development purposes.

Chloride Point, near Mercur Camp, Floyd District, has been making some cyanide shipments lately that have proven satisfactory to the management.

The Daisy Company, of Mercur, is increasing its milling capacity, and it is expected that from 150 to 200 tons of ore will be handled daily before the first of the coming year. Dividend payments are to be inaugurated in January.

The mill at the Dalton mines, near Marysville, is being put in shape to handle a large body of low grade ore recently uncovered in the mine.

Geyser-Marion, of Mercur, continues to ship cyanides, and the last shipment amounted to \$5,000.

Grand Central Mining Company of Mammoth, declared its regular dividend of 12 1/2 cents per share, payable on the 10th of Oct. The new hoist has been ordered and will be installed at the earliest possible moment. The company has at present under consideration the building of a tramway to connect the mine with the railroad, which will greatly lessen the cost of transportation.

WASHINGTON.

The Republic Mining Company has declared a dividend of 3 cents a share, or \$30,000, payable on Oct. 10. This is the first dividend to be declared, and it will be followed by many others. A year and a half ago stock in the company was selling at 10 cents a share, but the development of the mine has been very rapid since that time. A large mill has been erected and paid for and much preparatory work has been done in the mine. Good judgment and careful management has characterized the work of those who have handled the affairs of the mine, and it is something remarkable that dividends should be in order so soon after development commenced. The Republic mine is a great property, and it is to be hoped it may long remain in the list of dividend payers.

FOREIGN MINING NEWS

BRITISH COLUMBIA.

Texada Island.

A large force of men are at work at the Van Anda, and the shaft is rapidly gaining depth. Ralph Blewett is pushing the work in a manner that does credit to his bringing up. One hundred tons of hand-sorted ore is being sacked for shipment to Vivian & Son, Swansea, the ore having been purchased for that famous Welsh firm by P. Harvey of Vancouver. The ore will probably net \$25 per ton for the copper value alone, apart from the gold of which some assays have gone as high as \$80. The mine looks extremely promising.

The Marble Point and Raven claims, both on the Van Anda belt, also promise to be rich producers. The company have 25 claims crown granted along this ledge.

The Victoria mine, owned by the Kirk Lake Mining Co., is now idle, but work is expected to begin again shortly.—*B. C. Mining Critic.*

Ore Shipments.

The shipments of ore over the Kaslo & Slocan railway for the two weeks ending Sept. 28th as reported for *The Kootenian* were as follows:

Mine	Destination	Pounds
Payne.....	Pueblo.....	200,000
Ruth.....	Pueblo.....	90,000
Ruth.....	Everett.....	90,000
Montezuma.....	Kaslo.....	12,000

Total, 392,000 pounds, or 196 tons.

LOWER CALIFORNIA.

The Cyanide Process.

The fact that representatives of the Rose Cyanide Company, who operate an extensive plant on the well known Rose mine, at Victor, California, are visiting Alamo, in Mexican Gulch, Lower California, may prove more significant than it first appears. During the past decade a vast quantity of tailings has accumulated at the various mines in that district which it is possible may be profitably treated. Besides there are certain refractory ores in that section, particularly in the Jacalitos district, of the character that the Viznaga mine has recently taken in its lower levels, which may also find a solution by this process. Mr. Playter, the secretary of the company also visited Cedros Island and was much impressed by the magnitude of the ore bodies found there. His stay, however, was too brief to reach any definite conclusions.—*Lower Californian.*

MEXICO.

President Diaz in his message to the Mexican Congress, which convened Sept. 16th, 1898, said:

The development of the mining industry is further evidenced by the increase in the exportation of ore that has been observable for some time past. According to data published by the Finance Department with respect to the last fiscal year, the total value of the mineral products of all kinds passing through the custom house was \$91,250,000 in round numbers, showing an increase of \$10,500,000 over the value of similar products exported in the

previous year. Silver figures among said products to the value of \$67,000,000; gold to the value of \$16,000,000, silver valuation; copper, \$4,700,000; lead, \$3,000,000, and on a smaller scale, antimony, zinc, plumbago, coal, sulphur, asphalt, chalk and some other building materials.

New Sulphur Company.

H. J. Rubio, of the City of Mexico, recently returned from a trip to the top of Citlatepec mountain, where he went in company with his father and Engineer Webber to examine the rich sulphur deposits which they propose to develop. The mountain is about 17,372 feet high and is a veritable column of pure sulphur. The company proposes to begin work on the crater this winter. Several sacks of sulphur were brought back, which appears to be perfectly pure.

The mines at El Chorro in Guanajuata, are doing well; they are of gold and silver and of such undisputed richness as to warrant the owners in contemplating a narrow gauge railroad from Marfil to the mines, a distance of thirty kilometers. The petition of the parties for permission to build the railroad is now before the Mexican authorities.

Mr. Furness, of the ore-buying concern, has acquired mines at San Luis de la Paz concerning which he spoke with some enthusiasm, as yielding now a dividend.

SOUTH AFRICA.

SHAFT SINKING AT THE NIGEL DEEP MINE.

(District Heidelberg S. A. R.)

The near approach at this mine of the end of the sinking stage of development has been made the occasion of extraordinary efforts on the part of the mine staff and of the contractors, to show what they could do if put to it. The result has been the astonishing depth of 260 feet sunk on the incline within the last calendar month—a performance which puts anything else that we can learn about far into the shade. There is probably little doubt that this is a world's record; and how long it remains so, perhaps depends—more than anything else—upon the opportunity of getting the same management and the same workers together again. To Mr. E. H. Garthwaite, the general manager, who is from San Francisco, California; Mr. F. C. Roberts, the underground manager, and to the other strenuous workers engaged, are these results due. The following is an account of this feat:

From July 1st to August 1st D Incline Shaft was sunk from 946 feet to 1,206 feet—a total of 260 feet. This shaft is 14x7 clear. The vertical depth of same is 975 feet. The sinking was done by two 3¼" Ingersoll-Sergeant drills, working two men per shift; there has been absolutely no change of ground for the past 900 feet, since leaving the dyke at the second level. Another dyke was encountered at 1,190 feet.

From April 1st, 1898, to August 1st, 1898, this shaft has been sunk a total distance of 695 feet, or an average of 175¾ feet per month. The incline shaft is equipped with a double drum 7x12 underground engine, and besides handling the waste rock from the sinking (amounting to 60-70 tons daily) it also handled the rock from six drives with their respective winzes and rises. After leaving the incline the rock is hoisted up a 700-

foot vertical shaft. Four of the drives advanced a total of 513 feet during July, or an average of 128 feet for the month.

There still remains a distance of 60 feet to be sunk on the incline before starting to drive toward C shaft. The drive from C shaft has advanced 776 feet, leaving about 1,300 feet to connect with D shaft; it is expected that the connection will be made about January 1st, 1899. The mine foreman under whom this excellent work is being done is Mr. F. C. Roberts, who is also a Californian.

A 20-stamp mill (stamps 1,325 lbs. Sandycroft) has been ordered and is now arriving on the property. The mill excavations are well under way and the erection of the battery, cyanide and slimes plants will be started shortly.

GENERAL NEWS.

RECENT ADVANCES IN METHODS OF CONCENTRATION.

BY J. W. NEILL, OF UTAH.

[Concluded from issue of October 1, 1898.]

These are some of the thoughts I wish to present in a general line. The ordinary process of wet concentration is, as I have said before, an ore dressing, and the material which is usually produced is sent to some smelting works for its further treatment.

There are many kinds of ore which are apparently not fitted at all for concentration. The Tintic district of Utah is one of these. The ores from the Eureka hill from the "Mammoth," "Sioux" and the others to my observation did not seem to be in the least suited to concentration. Yet, at the present time there are in operation in Tintic three very large mills, one of one hundred, one of sixty and one of forty stamps, which are successfully operated today upon the ores of Tintic, and not by concentration alone, but include both the improved method of concentration which we know locally as the combination process and the other. By this method the ore is stamped, passed over to the amalgamator, and the pulp finally passed through the vanners where a percentage of the values is saved in the shape of concentrates; the pulp is passed from those vanners into the tailing pits where it is accumulated. From these it is passed on to pans where it is amalgamated; the values, or as much as possible of the values saved by raw amalgamation and the tailings are then passed out.

The first mill that I know of that was built on this plan was built in 1861—I think that is the date; the process was brought more prominently to notice in the workings of the Montana Company's mine and the Drum Lummon mine, at Marysville, Montana, and was introduced into this state by Mr. Robinson, who came here from Montana to introduce it. These mills handle from two and one-half to three tons of ore to the stamp; they save from sixty-five to eighty per cent. of metal values on the ores. Of this amount, taking eighty per cent. as the saving, fifty per cent. of savings in the pan and on the plates, and is shipped as bullion (silver bullion in this case) owing to the nature of the case, that bullion is, I fancy, from sixty to seventy fine. The balance of the material is shipped as concentrates and carrying from a few cents up to thirty five per cent. of lead, from twenty to sixty ounces silver and from five to fifteen dollars in gold. This material is bought at good figures by the local smelters, and all the

smelters of Colorado, and the cost of marketing the bullion in this way is one dollar a ton on the crude ore. The mills are handling their material at a cost of two dollars and a half to three dollars and a half per ton on the ore, with the other dollar added would make it from three and a half to four dollars per ton on the crude ore.

They are, I might say, today the life of the camp. With these mills, the ore of the value of fifteen dollars per ton, which otherwise would be of no value whatsoever to them—as the cost of milling and freight to the Tintic miners is ordinarily about the same per ton—brings a revenue to the companies that is undoubtedly sufficient to pay for the extraction of the high-grade ore which goes to market. This is a process which embodies concentration of ore dressing with the actual recovery of silver in bullion values.

I would like to call your attention to another method, another combination of processes which, while it is not in commercial use as this process is at Tintic, is yet of sufficient interest to you all to deserve a brief mention; and that is the process or method for treating mixed ores carrying iron pyrites, galena, zinc, copper pyrites, all the sulphides of the metals which are now so valuable to us here in Utah. This character of ore is most common and best known to us in Utah as occurring in Bingham. The ordinary wet concentration of this ore gives us a concentrate carrying, we will say, on an average of twenty per cent. of lead, five to fifteen of zinc, twenty per cent. of iron and a few per cent. of silica. This material is of course bought by the smelters. If there is any copper contained in the pyrites associated with this galena, that copper enters the concentrates and the local habits have always heretofore been that both copper and lead are not paid for in the same ore. Therefore, either the copper or the lead is lost, or one only paid for at a very largely reduced price.

The method which I am going to describe to you was invented and has been developed by myself quite largely. It consists in taking the ore as it comes from the mine and subjecting it to a roasting or heating process. This roasting or heating operation, (after the ore of course has been crushed) is only carried to the stage where the free sulphur and the sulphur of the copper or iron pyrites has been burnt off. That stage is very readily recognized as the sulphur burns with a blue flame and gives us sufficient heat to carry on the operation in nearly all the Bingham ores; and when this flame has disappeared the ore is all a deep red color, and the operation is finished. If the ore is withdrawn from the furnace at this stage and tested it will be found that the material which has heretofore been non-magnetic now contains the iron in a magnetized condition. It can, therefore, be separated from the other minerals, the lead, zinc, copper and gangue.

This operation, therefore, gives us at the start, iron concentrates of high grade, carrying very little lead, zinc, copper and a little silica. The tailings from that operation contain the lead and the zinc. They are now in an admirable condition to be separated by ordinary methods of wet concentration. The iron is in an admirable condition for further treatment, and the saving in freight and smelting charges on this material is in most cases sufficient to pay for the operation of roasting. I have some samples of this separated material which I intended to bring up with me, but as I was called upon unexpectedly to speak I have not them with me, and am very sorry I could not

have had them here. It is needless to go into detail. I would simply state by this method I have handled copper ores turning out tailings which run a trace of silver and gold and less than two tenths of one per cent. copper. I have made separations between blende and iron pyrites by which forty-seven per cent. concentrates have been turned out in the first operation. This would illustrate the matter.

It is needless to call the attention of these gentlemen in the region of this arid west to the advantages which this process would give in districts where water is scarce. The concentrates are at once a shipping product. Of course, applied to the ores carrying gold and other metals that are contained in the pyrites, the saving is only to that extent afore mentioned; but it leaves the material left behind in an admirable condition for amalgamation or for cyaniding.

These, then, would be steps in concentration suggested. The concentration by fire, known to most of us as pyritic smelting, deserves in Utah more attention than it has received. Particularly is this method adapted to the treatment of Tintic ores which are being treated by the combination process and many others which are not being treated at all. By this method the ore is treated in many places in the state. It is in use in Tasmania and five hundred tons a day are being treated by it. And in this method concentration can be effected in accordance with the degree of silver contained in the ore at the start. In other words, in the ores that are heavy with silver. It is needless to point out the advantages of this method. The costs of plant are less by nearly half than those for the large combination mills that would handle the same kind of ore. The cost of treatment will not exceed those of the combination mill more than a couple of dollars a ton.

In other words, I think there are many gentlemen present who will undertake to erect mills which handle one hundred and fifty tons and do it at a cost not to exceed five dollars a ton. It figures itself down, therefore, into a proposition of this kind—ninety-five per cent. of say fifteen dollars, less five dollars for the smelting; multiply that same number, fifteen dollars, by seventy per cent. or eighty per cent. of the values of the mill; take from this cost of the same process, cost of handling and concentration and it will soon figure itself out which process will give the most money in a case of this kind.

There are today in Tintic many thousands of tons of low-grade ore of fifteen dollars and less in value which is waiting to be shipped and realized from. At the same time there are awaiting the same treatment in Tintic and in Bingham thousands and thousands of tons of pyritic ore which would act as fuel and flux for these same ores. They are waiting for the brains and the dash combined to act upon them.

Those of you who go on the excursion to Bingham will see the pyrites there in abundance. Those of you who go to Tintic will probably be informed by those posted in that district that there is a zone in the mountains there from nine hundred to twelve hundred feet wide which will practically carry all the way across ores in value of nine dollars. Of course there are places that do not carry it, but that is probably an average at any rate of that vast territory; and I venture to say that if all this ore were to be handled and added to the large amount of ore now handled the expansion of our Utah industries would be a very pleasurable thing for us to witness.

I have no notes with me, and I fear I have exhausted your patience and I will draw to a

close. I am much obliged for your time and attention.

MR. CHRISTY (California): I would like to ask what the cost is per ton for treating tailings by the Peck process.

MR. NEILL: My own experience of the Peck process is that it can be done at a cost of two dollars. Of course the exact cost cannot be ascertained. I would say from what I have heard that the cost was less than one dollar. It has averaged between eighty-five and ninety-five cents, under certain conditions.

MR. CUTTING, (Nevada): I can say something about the Peck process. In one mill where the Peck process was worked, they saved less than fifty per cent. There was new machinery put in, and on the tailings where the Peck process was a failure they are now working those tailings with the old pan mill process and also the cyanide process. So I can hardly agree with the gentleman that the Peck process of concentration is a step in advance.

MR. ESSLER: I would say that I am from Montana where they put in a Peck mill that resulted by experiment in about one hundred tons capacity; and it has been so successful that at first being one hundred ton capacity, they are now putting up a mill of five hundred ton capacity. It has been a perfect and great success there.

THE ELECTRO-CHEMICAL AND ELECTRO METALLURGICAL INDUSTRIES OF EUROPE.*

BY JOHN B. C. KERSHAW, F. I. C.

In this article it is proposed to give some account of the processes that have been used, or are now being used, for the production upon an industrial scale of the four metals, viz., antimony, chromium, magnesium and nickel.

Only two of these metals—antimony and nickel—are of much commercial importance, and in the case of the other two, one manufactory could easily supply the present world's demand; but the electrolytic methods for the production of these metals are still of interest as exemplifying the point that it is the greater convenience and purity of the products of the electrolytic methods, rather than their greater economy, that has caused them in many cases to supersede the older methods.

Owing to the secrecy which is always observed when a process is worked in one or two places only, and to the absence of all inducements to publish details of the apparatus or procedure used, the facts given will necessarily be less full and complete than they might otherwise be.

Antimony.—One of the earliest attempts to separate this metal from a solution of one of its salts by electrolysis was made by Gore in 1858. An aqueous solution of antimony trichloride containing excess of hydrochloric acid was used as the electrolyte, with a cathode of copper and an anode of antimony. In place of the metallic deposit which he expected, he obtained a compound of antimony and antimony trichloride, known as "explosive antimony" on account of its property of decomposing with explosive force when rubbed. The deposition of metallic antimony from its solution upon a commercial scale remained in abeyance for many years after this date, and it is only recently that the appearance upon the market of thin plates of the metal of extreme density has proved that

*Electricity.

some of the difficulties in the production of metallic antimony by electrolytic methods have been overcome. These plates, according to Borchers, have been made by the Austrian branch of Siemens & Halske; but no details of the place of production, or the quantity produced, have yet been made public. The process patented† by Siemens & Halske for the electrolytic extraction of antimony from its ores has most probably been used for the production of these plates, and the following brief account of it may therefore be given:

The process depends upon the solubility of antimony sulphides in solution of sodium or potassium hydrosulphide, and the use of the electric current to deposit the antimony as metal from such solutions.

The chemical and electrolytic reactions which occur are as follows:

1. $\text{Sb}_2\text{S}_3 + 6\text{NaHS} = 2\text{Na}_3\text{SbS}_3 + 3\text{H}_2\text{S}$
2. $\text{Na}_3\text{SbS}_3 = 3\text{Na} + \text{SbS}_3$
3. $6\text{Na} + 6\text{H}_2\text{O} = 6\text{NaOH} + 6\text{H}$
4. $\text{SbS}_3 + 6\text{H} = \text{Sb} + 3\text{SH}_2$
5. $3\text{NaOH} + 3\text{SH}_2 = 3\text{NaHS} + 3\text{H}_2\text{O}$

The solution of the antimony sulphide by the solvent, represented by equation (1) takes place in a leaching vat, in which the crushed ore is treated with the solution of sodium hydrosulphide.

The solution is then separated from the residuum in a filtering vat, and is run into the electrolyzing vat where it is subjected to electrolysis.

Equation (2) shows the direct products of the electrolysis, while equations (3), (4) and (5) show the secondary reactions which immediately follow, and produce as a final result—antimony at the cathode and sodium hydrosulphide at the anode. If desired, the electrolysis can be carried out with a solution of sodium chloride in the anode chamber of the depositing cell. In this case free chlorine will be obtained at the anode, and by suitable arrangements it can be collected and used for opening up refractory ores.

Borchers, who has designed an apparatus for depositing antimony from the same solution, states that an EMF. of between 2 and $2\frac{1}{2}$ volts is sufficient to give a current density of from 4 to 5 amperes per square foot.

The greater number of antimony ores can be easily dealt with by the present furnace methods of reduction, and it is only in connection with refractory ores, or with furnace mattes, that the electrolytic method is likely to develop. At present it is of hardly any industrial importance; and it has only received mention because electrolytic antimony has been put upon the metal market in Europe.

Chromium.—This metal was first obtained by electrolytic methods by Bunsen in the year 1854. He used a solution containing both chromous and chromic chlorides, and he was surprised to find that by varying the current density employed, he could obtain either hydrogen, chromium, sesquioxide, chromium trioxide, or metallic chromium at the cathode. This historic experiment showed the important part played by the current density in determining the final products of the electrolysis. More recently Moissan, the distinguished French chemist, has obtained chromium by a method that is purely chemical in character, though electricity has been used to produce the heat required. Moissan heated chromium sesquioxide with carbon, in his electric furnace, and in this way obtained reduction of the oxide by the carbon, and the production of metallic chromium.

The metal is now produced commercially by

the "Elektro Chemische Werke," Bitterfeld, but no details of the process or apparatus used have been published. The writer believes, however, that it is produced by a method based upon that of Moissan, though doubtless the details of the process and of the furnace construction differ from those used by Moissan himself. It may be added that the honor of the discovery of the fact that all oxides could be reduced by carbon at the temperature of the electric furnace is shared with Moissan by Borchers, though it was Moissan alone who systematically investigated electro furnace reactions.

Chromium is of importance, not only as the metal which possesses the highest melting point, (it cannot be fused in the oxy-hydrogen flame) but also because it confers great hardness upon metals with which it is alloyed. Though an electrolytic method of depositing chromium from mixed solutions of its sulphate and potassium sulphate has been patented by MM. Placet & Bonet (U. S. A. patent, No. 526,114) it is probable that the demand for metallic chromium in the arts will be wholly met by the electro metallurgical method that has been described.

Magnesium.—In the year 1832 Becquerel, one of the early experimenters in electrochemical science, is stated to have obtained metallic magnesium by electrolysis of a concentrated solution of magnesium chloride. Magnesium is one of the metals which cannot exist as such in the presence of water, but under certain conditions small quantities of the metal can be obtained at the cathode from aqueous solutions of the chloride.* There is no doubt, however, that in 1848 Wohler prepared large quantities of magnesium by electrolysis of the fused chloride, and Bunsen in 1854 repeated the experiment, substituting however a mixture of ammonium and magnesium chlorides for the latter salt, on account of the greater ease with which it could be prepared. Matthiessen later used a mixture of potassium and magnesium chlorides for the electrolysis; and this is the method now followed at the "Aluminium und Magnesium Werke" at Hemelingen in Germany, carnallite, a natural product (of the composition $\text{MgCl}_2 \cdot \text{KCl} \cdot 6\text{H}_2\text{O}$), being substituted for the artificial mixture suggested by Matthiessen. The carnallite is fused in a metal or porcelain pot, by external heating, and the fused mass is electrolyzed with carbon anodes and metal cathodes. The magnesium, as it separates at the cathode, collects into globules, and falls to the bottom of the vessel in the molten state. Reducing gases are led into the pots during the electrolysis through openings in the covers, but, according to Borchers, this is an unnecessary precaution. An EMF. of 7 to 8 volts will suffice to produce a current of 90 amperes per square foot through the molten carnallite. In addition to the factory at Hemelingen, magnesium is produced at "Grabau's Aluminium Werke" at Trotha, near Halle, and at the "Elektro-Chemische Werke," Bitterfeld.

Though no details of the process or apparatus used at these works have been published, there cannot be any doubt that in principle the process resembles that used at Hemelingen, though the apparatus in which it is carried out doubtless differs in each works. Oettel states that in consequence of the adoption of electrolytic methods, the price of magnesium has dropped 70 per cent.; in this case, therefore, the gain has been not only in convenience and purity but also in economy.

Nickel.—This metal was first obtained as a

deposit upon the cathode of an electrolytic cell by Gahn, in the earliest years of the century, before even Davy had discovered potassium and sodium by electrolysis of their fused hydrates. Nothing further was done in connection with the electrolytic deposition of nickel until 1862, when the two Becquerels published the account of their researches upon the best conditions for obtaining adherent and homogeneous deposits of many metals, nickel being one of their number. The solution which yielded the best in their hands was a neutral nickel sulphate solution. The progress of electro-plating, in which for nickel deposits solutions containing nickel and ammonium sulphates were employed, led to great improvements in the coatings of nickel obtained by electrolytic methods, but it was not until recent years that the production of nickel for commercial purposes was attempted by means of electrolysis. The delay in further development was caused by the inability to produce coatings of any considerable thickness; scaling and other evils always occurred when a certain point was exceeded. Foerster has recently shown that if the electrolyte be heated to between 60° and 90°C , tough deposits of nickel of any desired thickness can be obtained, without the exhibition of any tendency to scale.*

In Europe so far as the writer is aware, there is only one firm producing electrolytic nickel, namely, "Gustav Menne u. Cie." of Siegen, Germany, but in America the "Orford Copper Company" and the "Canadian Copper Company" are both producing nickel by electrolytic methods. In all these cases, the principle of the process used is the same. A matte or regulus containing copper and nickel produced by ordinary metallurgical methods is used as anode; and a deposition of the one metal is effected while the other remains in solution. At Siegen, the writer understands that they are using a regulus containing 40 per cent copper and 30 per cent nickel, and the electrolyte is believed to be a solution of copper or nickel sulphate. If acid, copper alone is deposited, while if the solution be neutral, the nickel will be deposited also. This difference has been made the basis of an analytic method for the separation of copper and nickel, so its effectiveness for obtaining a separation of the two metals upon an industrial scale is assured. Nickel is one of those metals for which there is a steady and growing demand in the arts, and since the separation of copper and nickel is not easily effected by furnace methods of procedure, there would appear to be a highly successful future before the electrolytic nickel industry.†

Wm. T. Smith & Co., composed of the well-known William T. Smith and E. A. Anderson, assayers and refiners and purchasers of gold and silver bullion, placer and retort gold of all kinds, ores, etc., have removed to their new and commodious quarters at 114 N. Main street, Los Angeles, Cal.

The firm of Wm. T. Smith & Co., gold and silver refiners and assayers was established in Providence, R. I., in 1854 by the father of the present Wm. T. Smith, who later associated his son with him.

The Los Angeles firm was established in 1895. The company proposes to act as consulting metallurgists, mining experts and constructing engineers.

†German patent No. 67,973.

*Lupke. "Grundzüge der Electro-chemie," 1896, p. 150.

*Zeits. f. Electro-chemie, vol. IV, p. 160.
†The historical notes in this article have been taken from Ahrens' "Handbuch der Elektro-chemie," Stuttgart, 1896.

Cost of Ore Treatment in Colorado.

For quartz or silicious ore averaging 50 per cent excess in silica the smelters pay 95 per cent for the silver (New York quotations) \$16 to \$20.50 per ounce for gold when ore contains from 0.05 to 2.00 ounces per ton. Some smelters pay for gold when present in ores in amounts of one tenth of an ounce or more; other smelters pay for amounts as low as one-twentieth. The treatment cost runs from \$7 to \$12, treatment on this class of ore depending upon the grade and desirability of the ore at the time offered for sale.

Silicious ores under \$50 per ton generally get an \$11 treatment charge, and in special cases as low as \$7. High grade silicious ores must meet charges of \$12, and if they contain tellurium, antimony and arsenic, the charges sometimes run as high as \$18 per ton. Cripple Creek ores being silicious, generally command a fixed rate of \$10 for treatment and \$20 an ounce paid for gold. Imported lead ores from Idaho, British Columbia, Mexico and Utah are paid for at the rate of 90 per cent of the lead values (with exceptions in special cases), and 95 per cent of the silver values, with treatment charges from nothing to \$8. If an ore carries less than 5 per cent lead it is classed as a dry ore and the lead is not paid for. Most local lead ores are purchased by the smelters on a sliding scale of so much per unit, based on a price of \$4 per 100 pounds. The more lead an ore contains, the better price per unit it commands. An ore carrying say ten per cent lead, would today be worth \$1 per ton for the lead contents, while if it contained 50 per cent lead it would be worth close to \$20 per ton. Sulphide iron ores are generally sold on a neutral basis. A neutral ore is one that contains approximately equal amounts of iron and silica. The smelters will make a fixed charge for this ore, ranging from \$4 to \$7 per ton, according to grade of ore. If the ore contains excess of silica over iron they charge 15 cents per ton for each unit of excess, and vice versa, allow 15 cents per ton for each unit of excess of iron over silica. Therefore, if one has an ore on which the smelters make a fixed smelting charge of \$5 per ton, and this ore shows 20 per cent excess iron, the sum of \$3 (20x15) is deducted from the neutral charge of \$5, making the actual cost of the treatment only \$2. On the other hand, if this same ore carries 20 per cent excess silica, the total smelting charge will be \$5 plus \$3, or \$8 per ton.

The smelters pay for copper ore on a sliding scale. When an ore contains from 2 per cent to 10 per cent copper (less than 2 per cent is not generally paid for), the owner of the ore receives from \$1 to \$1.05 per unit for the copper. Thus an ore showing 10 per cent copper would be worth from \$10 to \$10.50 per ton. When the ore shows from 10 to 20 per cent copper, \$1.10 to \$1.15 is allowed per unit, and so on up to 50 per cent copper, where as high as \$1.80 per unit is sometimes paid. When an ore contains zinc or arsenic or antimony in amounts varying from 5 per cent to 10 per cent, a charge is made of 25 cents to 50 cents per unit for each unit over 10 per cent, or 5 per cent (whatever the limit fixed by the smelters). If an ore contains 18 per cent zinc, with 10 per cent limit, there is 8 per cent that the smelter will charge us for at 50 cents a unit, or \$4 to be added to the cost of treatment per ton. The prices and limits made by different smelters vary somewhat, according to the amounts of the different kinds of ore they may need to make up their proper mixtures. If they are short on silicious ores they will charge less for smelting that class of ore, and

vice versa. The lead smelters pay well for all classes of ores. The copper smelters pay highest prices for copper ores. The pyritic smelters only desire low grade sulphide ores carrying copper and excess iron with no lead. Ores containing lime gangue are in great demand at all smelters, 10 cents a unit being generally allowed for each unit excess of lime over silica.

The Haskens Process.

A new method of preserving wood from decay, known as the Haskins process, is being tried on a large scale in England. Instead of withdrawing the sap and injecting creosote or some other antiseptic substance, as is usually done, Mr. Haskins submits the wood to superheated air, under a pressure of fourteen atmospheres. By this process, it is averred, the sap is chemically changed into a powerful antiseptic mixture, which, by consolidating with the fiber, strengthens as well as preserves the wood.

James Irving has associated with himself C. H. Schwettman, and will conduct an establishment for the refining and assaying of gold and silver, together with other chemical determinations, at 128 N. Main street, Los Angeles, Cal., under the firm name of James Irving & Co. They will also examine, report on and purchase mining properties; and will act as consulting metallurgists. The highest cash price will be paid for old gold and silver, placer and retort gold ores, etc. Returns on bullion will be made by this firm within four hours after receipt.

MINING LAW.

Questions and Answers.

(Q.) Please answer through the Mining Law column of the JOURNAL whether or not the location notice herewith is legal and if it would hold a claim. Remaining yours respectfully, J. W. W.

NOTICE OF LOCATION.

Notice is hereby given that in compliance with the revised Statutes of the United States we have this day located the following described quartz mining ground:

Viz.: Commencing at this monument and running southerly 750 feet, thence westerly 600 feet, thence northerly 1500 feet, thence easterly 600 feet, thence 750 southerly to this monument or place of beginning. Together with all dips, spurs and angles, all wood and water for mining purposes. Situated in Mint's Mining District, Los Angeles county, State of California, in Tick Canon, west extension of Champion mine, bears S. E. $\frac{1}{4}$ -mile, an arastra 200 feet in Tick Canon. This mine shall be known as the Moonshine, and is a relocation of the Texas Siftings mine. Located this 6th day of January, 1896, and we intend to hold and work same according to local rules and customs of said district.

Witness:
JAMES ROBERTSON,
D. M. BOWMAN,
T. W. LYONS,
B. HEMER, Locators.

Recorded Jan. 20th, 1896.

C. D. RUSH, Recorder.

(A.) J. W. W.: The copy of the location certificate is not sufficient to stand, as it does not describe the claim "with reference to natural objects or permanent monuments in such way as shall identify the claim with reasonable certainty" as required by statute.

The courts have held that the location certificate must describe the land in such manner that a man of fair intelligence can take the certificate and without further aid find the claim and all the ground segregated by it from the public domains.

This certificate should be measured by the law as it existed before the 1897 law was passed, and is wholly insufficient under either the old law or the new.

PERSONAL NEWS ITEMS

PROF. ALEX. ELLIOTT, late science teacher in the Occidental College, has opened a Science School and Assay Office at 614 S. Hill street, Los Angeles, Cal. Prof. Elliott is well qualified, both as a teacher of natural science and analytical chemistry, holding certificates of proficiency from the Science and Art Department, London, England. His wide knowledge of chemistry and experience in experiment work gives him an advantage as a teacher, an assayer or an analytical chemist. A feature of the business will be the developing of new industrial processes.

LEW E. AUBURY, mining engineer of Los Angeles, has returned from an extensive mining examination in Riverside county, Cal., for an Eastern syndicate.

W. A. HUSBUND, of Kelsey, Cal., manager of the Gopher, Boulder and Delmotin mines, has been in Los Angeles for a few days visiting friends.

MESSRS. GEO. H. BRADFORD and S. L. HARRIS of San Francisco, are in Los Angeles, Cal. They are the principal parties in the California Borax Company, and are here arranging for machinery to erect a plant on the land recently purchased in counties of Kern and Inyo.

JOSEPH RUSE, the Denver mining man who returned to Denver from Old Mexico, (that being his fifth trip there) some time ago, seems to be well pleased with his purchase of the La Cumbre mine, and speaks in the most glowing terms of Guadalupe, state Jalisco, and other places visited by him while in Mexico.

N. S. BERRY, a well known mining man of New Mexico, has been in Arizona for several weeks looking up new mining business.

MR. J. A. COMER of the Colorado and California Mineral Developing Company of Los Angeles, Cal., left Oct. 10th for Arizona on a business trip for the company.

CAPTAIN W. W. MARSH arrived in the Black Hills from Omaha, last week. He stopped a few days at the St. Elmo property at Hill City. A large force of men is at work opening up the mine.

ROBERT and ELLE OLD, of Georgetown, Colorado, have taken an appeal to the United States Court of Appeals, St. Louis, in their case against the New Dunderberg Mining Company. The suit is for damages of \$300,000, the plaintiffs alleging the defendant company sunk a shaft on adjoining territory to the plaintiffs' and then drifted to the latter's vein, extracting ore of the value stated.

The Compania Industrial Mexicana at Chihuahua, is preparing to put in large rolls for making steel rails and other large irons for mining purposes.

DAVID HUNTER, the new general manager of the Hawkeye-Pluma Free Gold Mining Company of Deadwood, S. D., is expected in the Black Hills from Iowa, to take charge of the company's business.

MR. W. BELL, of Pinos Altos, New Mexico, fame, was a caller at the JOURNAL office last week. Mr. BELL has just returned from an extended eastern trip and expects to settle in Los Angeles, Cal.

JOHN N. ESSELSTYNN, M. E., who has been with the United Globe mines for the past six months, took his departure last week for Mercur, Utah, to fill the position of superintendent of the De Lamar Mercur gold mine.

JESSE McDONALD, the cyanide man, who is now in San Francisco, Cal., will return to Arizona soon. Mr. McDONALD thinks there will be unusual activity in mining this winter in the southwest.

J. T. CORNFORTH, the Pioneer miner of Denver, Colorado, has lately found his way into Dawson, N. W. T., and is contemplating the construction of a toll road up the Yukon valley from Caribou Crossing to Fort Selkirk.

SENATOR S. W. DORSEY of Denver, Colo., is looking up some Southern California properties and it is expected that he will visit Arizona.

OBITUARY.

ED. W. GIRARD, the well known Silver Peak, Nev., miner, died in the German Hospital at San Francisco last week. The deceased young man had been in poor health for over a year. Several weeks ago, while working in a mine at Silver Peak, some internal tissue seemed to give way and since then he was unable to work at all. He was a native of Germany but came to this country in early childhood. For the past few years he has been mining in southern Inyo county.

KAINIT.

Invoice weights as taken at port of shipment per ton of 2,240 lbs. testing 12.4 per cent. actual potash, equivalent to 23 per cent. sulphate of potash, \$8.55 @ \$8.80 for New York and Boston; \$8.90 @ \$9.15 for Norfolk, and Philadelphia; and \$9.05 @ \$9.30 for Charleston, Savannah, Wilmington, N. C., and New Orleans.

NITRATE OF SODA.

Spot nitrate is in ample supply and buyers have the upper hand for the present. We have again to quote a little lower price, \$1.50 @ \$1.55 per 100 lbs. for spot. The same figures are quoted for futures, in view of the quantities known to be afloat for New York.

FINANCIAL NOTES.

The statement of the United States Treasury, on Thursday, Sept. 29, shows balances in excess of outstanding certificates as below, comparison being made with the statement for the corresponding date last week:

	Sept. 29,	Changes.
Gold.....	\$243,010,017	D. \$869,406
Silver.....	7,233,176	D. 168,645
Legal Tenders.....	39,143,764	D. 6,368,930
Treasury Notes, etc.....	1,413,199	D. 889,493
Totals.....	\$290,831,356	D. \$8,296,444

Treasury deposits with national banks amounted to \$79,740,464, an increase of \$3,392,304 during this week.

Average Prices of Metals

	Copper	Tin	Lead	Spelter
January.....	10.99	13.57	3.65	3.96
February.....	11.28	14.08	3.71	4.04
March.....	11.35	14.38	3.72	4.25
April.....	12.14	14.60	3.63	4.26
May.....	12.00	14.52	3.64	4.27
June.....	11.89	15.22	3.82	4.27
July.....	11.63	15.00	3.95	4.66
August.....	11.89	15.23	4.00	4.58
September.....	12.39	16.23	3.99	4.67
October.....	—	—	—	—
November.....	—	—	—	—
December.....	—	—	—	—

Average Monthly Prices of Silver.

	1898	1897	1896
In New York per ounce Troy, from January 1st, 1898, and for the years 1897 and 1896:			
Month.....	Cents.	Cents.	Cents.
January.....	56.77	64.79	67.13
February.....	56.07	64.67	67.67
March.....	54.90	63.05	68.40
April.....	56.02	61.85	67.92
May.....	56.98	60.42	67.75
June.....	58.61	60.10	68.69
July.....	59.06	59.61	68.75
August.....	59.54	54.19	67.34
September.....	60.68	55.24	65.68
October.....	—	57.51	66.93
November.....	—	57.91	64.93
December.....	—	58.01	65.24
Year.....	—	59.79	67.73

Gold and Silver Exports and Imports.

At all United States ports, August, 1898, and year from January 1st, 1898 and 1897:

	AUGUST, 1897	1898
Gold—		
Exports.....	\$1,983,588	\$1,955,995
Imports.....	4,720,569	6,822,027
Excess.....	I. \$2,736,981	I. \$4,866,119
Silver—		
Exports.....	\$5,164,992	\$4,798,478
Imports.....	3,055,209	3,955,610
Excess.....	E. \$2,109,783	E. \$902,868
EIGHT MONTHS, 1897		1898
Gold—		
Exports.....	\$3,542,659	\$9,679,113
Imports.....	11,897,654	103,087,831
Excess.....	E. \$20,655,005	I. \$92,408,718
Silver—		
Exports.....	\$38,024,196	\$34,281,397
Imports.....	10,796,638	18,813,593
Excess.....	E. \$17,227,558	E. \$14,467,804

This statement includes the exports and imports at all United States ports, the figures being furnished by the Bureau of Statistics of the Treasury Department.

Exports of specie from San Francisco for the month of July were as follows:

	Gold	Silver	Total
To Hong Kong.....	\$5,570	\$1,500,818	\$1,506,388
To Honolulu.....	100,000	1,000	101,000
To Central America.....	7,900	7,900	7,900
To Mexico.....	500	500	500
To New York.....	3,149,368	203,588	3,352,956
Totals.....	\$2,257,688	\$1,713,366	\$3,970,944
Totals, 1897, 1,187,187,140	1,336,869	2,523,949	

The silver included \$365,088 in bars, \$1,534,218 in Mexican dollars, \$8,500 in Peruvian sols, and \$5,500 in United States coin. Of the gold \$2,253,638 was in coin and \$4,000 in bullion. All the gold bullion went to New York.

Treasurer's Report.

The statement of the United States Treasurer gives the amount of current money in the country as below on September 1st:

	In Circulation	In Treasury	Totals.
Gold coin.....	\$630,693,166	\$148,209,407	\$778,902,573
Silver dollars.....	57,738,313	406,266,200	464,004,512
Subsid. silver.....	24,659,523	10,993,449	35,652,972
Gold certificate.....	35,473,009	1,646,149	37,119,149
Silver certificate.....	392,990,373	8,117,131	401,107,504
Treas. nts. 1890.....	94,020,054	99,260,280	193,280,334
U. S. notes.....	274,395,381	74,285,435	348,680,816
Currency cert.....	30,250,000	280,000	30,530,000
Nas. bnk. nts.....	212,845,926	4,415,724	217,261,650
Totals.....	\$1,792,096,545	\$658,545,211	\$2,450,641,756

WANTS

Advertisements of this class containing not more than five lines will be inserted for not exceeding three months in any year, free of charge, to all paid-up annual subscribers. Other than above \$1.00 per month. Advertisements not accepted for less than one month.

WANTED—Situation by Millman and Assayer; Wages reasonable; Good references. Address "H" JOURNAL OFFICE

EXPERIENCED Assayer and Cyanide operator desires engagement. The successful and economical treatment of slimes or tailings by cyanide a specialty.

Address W. V. WATSON, Ely, White Pine Co., Nev.

AN EDUCATED Chemist and Millman, thoroughly understands Milling, Chlorination and Cyanide Processes. Twelve years experience in Montana and Colorado, now open to an engagement. Moderate salary. Address: "Chemist" JOURNAL OFFICE, Los Angeles, Cal.

WANTED, by a young man, a position as Assayer, etc.; experienced, competent and has a good knowledge of all metallurgical operations. Good references. Address, T. K. JOURNAL OFFICE, Stimson Block, Los Angeles, Cal.

Mine Wanted

MINING MAN of experience will develop Gold property of merit for 1/2 interest, or will bond whole mine and develop. Correspondence with owners only. Give full particulars. Will give satisfactory references. Address P. O. Box 887, Los Angeles, Cal.

FOR SALE!

I HAVE some good gold mining properties for sale at reasonable prices, some developed and some real good properties at Ward, Eldora, Gold Hill, Jamestown, Magnesia, Caribon and Sugar Loaf. Write stating what you want or call on me. JAMES M. NORTH, Former County Judge, BOULDER, COLO.

A FINE Copper property in Mexico. A one-half interest in a good producing copper property will be given for required capital to do the necessary development work and placing machinery thereon. Substantial guarantee. Address "MINER," 1032 Mission St., San Francisco, Cal.

A VERY valuable, extensive Lead Mining Property in Southwest Virginia. Shafts sunk over 200 feet and actual work has demonstrated richness of veins and purity of ore. Address: GEORGE FRANK, Baltimore, Md.

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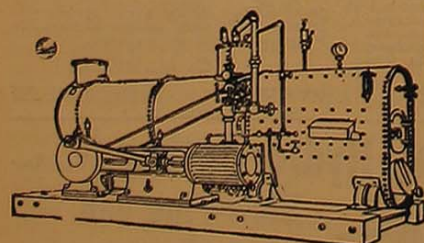
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One 60 H. P. Locomotive Boiler and all necessary fittings.
One 50 H. P. Engine and all necessary fittings.
One 50 H. P. Heater and Pump, (Boiler Feed).
One No. 8 Sand Pump, Hose and all connections.
One Copper Plate which is silver plated, 48"x60" and a lot of Piping, Scales, etc.
Plant now set up in place in New Mexico. Will sell for 1/3 original cost and guarantee to be in good order. If interested, correspond with

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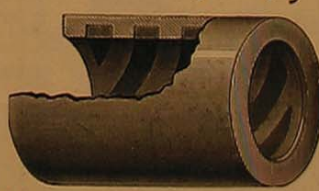
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Mines Examined and Reported on.

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A. A. WARREN

ASSAYER AND
ANALYTICAL CHEMIST

COLTON, - CALIFORNIA

MINING STOCK QUOTATIONS

BOSTON	
Aetna Con.	Gold Coin 00
Alfouze	3 50 Humboldt 4 50
Anacoda	22 00 Illinois Steel 71 75
Armadillo	2 75 Merced 6 25
Ash Bed	2 50 National 25
Atlantic	26 50 New Idria Mfg 28 25
Baltic	16 50 Old Dominion 55 00
Bonanza	45 Osceola 55 00
Boston & Mont'a	12 1/2 Parrott 23 50
Breece	1 50 Pioneer 5 25
Butte & Boston	23 00 Quincy 119 00
Calumet & Hecla	585 00 San Ysaac 5 00
Catalpa	175 00 Tamarack 175 00
Centennial	18 35 Tecumseh 3 00
Dominion Coal	25 00 Victor 8 00
Dominion Pref.	112 50 Washington Ming 28 00
Franklin	14 00 Wolverine 28 00

NEW YORK.

Alamo	03 1/2 Homestake 29 50
Alice	40 Iron Silver 55
Annetta	45 Mexican 30
Best & Belcher	60 Mollie Gibson 19
Brunswick	05 Ontario 4 50
Bullest	05 Ophir 10
Crown Point	65 Pharmacist 10
Con. Cal. & Va.	— Plymouth 3 00
Cripple Creek Con	08 1/2 Quicksilver 3 00
Deadwood	00 Quicksilver pfd. 11 00
Favorite	11 25 Sierra Nevada 80
Fortuna	04 Standard 1 60
Golden Fleece	45 Union Con 24
Gould & Curry	45 Yellow Jacket 25
Hale & Norcross	—

SAN FRANCISCO.

Alpha	04 Hale & Norcross 1 65
Alta Con	12 Justice 08
Andes	13 Mexican 27
Belcher	21 Occidental 52
Best & Belcher	16 Ophir 60
Bodie	— Overman 07
Bullion	10 Potosi 23
Caledonia	52 Savage 19
Challenge	13 reg. Belcher 03
Chollar	21 Sierra Nevada 30
Confidence	40 Silver Hill 10
Con. Cal. & Va.	90 Union Con 24
Crown Point	20 Utah 06
Gould & Curry	30 Yellow Jacket 25

COLORADO SPRINGS STOCKS

Acacia	02 1/2 Isabella 23
Alamo	02 1/2 Jack Pot 07 1/2
American Con.	01 1/2 Little 8
Anacoda	37 Kimberly 9 5/8
Argentum Junata	20 Magnet Rock 002 1/2
Banner	98 Matos 2 1/2
Bob Lee	00 1/2 Mineral Rock 12
Creede & C. Co.	04 Mountain Beauty 01 1/2
Dante	04 Mollie Gibson 19 1/2
Des Moines	01 1/2 Moon Anchor 87
Elkton Con	98 Mount Rosa 12
El Paso	07 1/2 New Haven 01 1/2
Emma Almee	003 Oriole 008
Fanny R.	21 Orphan Bell 66
Favorite	02 1/2 Peoples 01
Findley	05 Pharmacist 03 1/2
Flower of the W.	005 Pilgrim C. 02
Franklin	003 Portland 1 18
Golden Crater	— Pr. Albert 0 3/8
Golden Fleece	22 Rattler 01 1/2
Gold & Globe	01 1/2 Specimen 03 1/2
Gold King	55 Theresa 06
Gould	03 Treachery 02
Granite Hill	01 Union Gold 13 1/2
Hayden	004 Work 05 1/2
Ingham Con	04 1/2

SALT LAKE CITY

Alice	60 Little Pittsburgh 02 1/2
Ajax	42 Malvern 1 79 1/2
Alliance	05 Mammoth 1 79 1/2
Anchor	60 Maxfield 7 16
Buckeye	01 Mercu 7 16
Bullion Beck	5 50 Morpan 07 1/2
Cent. Eureka	30 00 Northern Light 61
Chloride Point	97 Omaha 5 50
Daisy	61 Ontario 1 00
Dalton	00 1/2 Overland 1 00
Dalton & Lark	04 Richmond Anaconda 04 1/2
Daily West	3 50 Rover 40
Dexter	1 99 Sacramento 57 1/2
Eagle	07 1/2 Silver King 24 00
Eagle & Blue Bell	1 00 Sioux Con 05 1/2
Four Aces	07 Sunbeam 40
Galena	33 Sunshine 2 70
Gemini	65 So. Swansea 1 21 1/2
Geyser-Marion	65 So. Swansea 1 21 1/2
Grand Central	6 95 Utah 64
Homestake	— Valco 50
Horn Silver	1 15 Young America 50

ROSSLAND, BRITISH COLUMBIA.

Alecta	10 Jumbo 37
Big Three	10 Knight Templar 05
Butte	01 1/2 Kootenay-London 18
Caledonia Con	05 Le Roi 50
California	15 Lilly May 19 1/2
Camp Bird	05 Mabel 15
Celtic Queen	05 Mayflower 08
Centre Star	32 Monita 14
Colonna	10 1/2 Monte Christo 34
Commander	10 1/2 Morning Star 08
Deer Park	18 1/2 Mugwump 05
Della Colla	02 Nest Egg 03
Delaware	12 Northern Belle 04 1/2
Eastern Star	20 Novelty 03 1/2
Enterprise	18 O. K. 02
Eric	03 1/2 Palo Alto 02
Eureka Con	06 1/2 Phoenix 08
Evening Star	05 1/2 Poorman 13 1/2
Georgia	12 1/2 R. E. Lee 15
Gertrude	05 Red Eagle 05
Golden Drip	15 Red Mount View 10
Good Hope	02 1/2 Red Point 10
Grand Prize	02 1/2 Rossland H'mest'ke 05
Great Western	08 1/2 Rossland, Red Mt. 21
Hattie Brown	03 St. Elmo 05
Helen	04 St. Paul 12 1/2
High Ore	04 Silver Bell 05
Imperial	10 Silverline 05
Iron Horse	07 So. Cross & W. Con 20
Iron Mask	1 00 Virginia 1 02
J. K. L.	10 War Eagle Con 2 75
Josie Mac	30 West Le Roi 28
Josie	30 White Bear 09

DENVER STOCK REPORT.

Aetna	001 Keystone 04 1/2
Anchoria Leland	57 Little 99
Anacoda	37 Matos 22 1/2
Arcadia	01 1/2 Mollie Gibson 20
Argentum Junata	20 1/2 Moon Anchor 97 1/2
Banner	— Mt. Rosa 12
Bob Lee	01 Old Gold 01
Elkton	98 1/2 Peoples 01
El Paso G.	07 1/2 Pilgrim C. 02
Enterprise	04 Pine Creek 00 1/2
Fanny R.	21 Portland 1 18
Garfield Grouse	— Prince Albert 01 1/2
Geo. Washington	002 Republic 02 1/2
Golden Eagle	29 Sacramento 02 1/2
Gold Coin	96 Smuggler 24
Gilpin & C. C.	40 Specimen 03 1/2
Gilpin Four	004 1/2 Tamarrack 007 1/2
Golden Fleece	22 Union Gold 13 1/2
Isabella	23 Virginia M 03 1/2

Iron Clad	02 1/2 Wheel of Fortune 002 1/2
Jack Pot	03 1/2 Work 02 1/2

MEXICO

Name of Company	State	Price
Alianza	Hidalgo	5
Amistad y Concordia	"	24
Angustias	Guanajuato	380
Arenal y Anexas	Hidalgo	240
Asturiana y Anexas	Zacatecas	150
Barradon y Cabras	Durango	150
Bartolome de Medina	Hidalgo	100
Cabezon y An	Zacatecas	30
Candelaria de Pinos	"	160
Capusaya	Durango	120
Carmen	Hidalgo	400
Castellana y San Ram	Tepec	25
Cerro Colorado	Chihuahua	10
Cinco Senores y An	Guanajuato	460
Concepcion y Anexas	S. Luis Potosi	100
El Oro	Mexico	180
Esparanza y An	Guanajuato	40
Guadalupe	Guanajuato	1,300
Huautla	Santa Ana	100
Luz de Borda	Michoacan	40
Luz de Maravillas	Hidalgo	100
Palmiton	Zacatecas	150
Palma	"	100
Paraiso de los Com	"	5
Real del Monte	Hidalgo	900
Refugio y Va	"	8
Restauradora	Durango	80
San Francisco	Hidalgo	270
S. Fed. Chalchihuites	"	12
San Rafael y Anexas	"	925
do. Free Stock	"	400
San Rafael del Oro	Hidalgo	20
Ste. Maria de la Paz	S. Luis Potosi	650
Sirena	Durango	50
Solieda	Hidalgo	500
Sorpresas	"	250
Trinidad	Guanajuato	40
Tlaxingo	Puebla	27
Union	Hidalgo	280
Zonahuaucan (gold)	Vera Cruz	100
Zoma Min. de Poros	Guanajuato	15

Note—The above Mexican stocks are figured on the basis of Mexican silver

ORE TESTING

Complete mill for testing ores on practical scale by all processes to determine the best process adapted to treating any ore submitted. Processes in use investigated to overcome unnecessary losses, etc.

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ROCK DRILLS,
Stone Channelers,
The Pohle Air Lift Pump,
Coal Cutters,

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New Catalogue No. 41

Pamphlet No. 100

Catalogue No. 72

Special.

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NEW YORK.

JAMES F. BURNS, Pres't. JOHN HARNAN, Gen. Man.
FRANK O. BECK, Sec'y and Treas.

THE PORTLAND GOLD MINING CO.,
(Stock Transfer Office, Colorado Springs.)
Mines at Victor, Colorado.

COLORADO SPRINGS, COLO., May 19, 1898.

The Ingersoll-Sergeant Drill Co.,
Gentlemen:—We bought two years ago one of the largest

size of the straight line type of Ingersoll-Sergeant Piston Inlet Compressor.

This was found to be too small for our needs about a year ago and we purchased of you a Duplex Corliss machine

16" x 18 1/2" x 42". This was set in place in our shaft house in the Cripple Creek District, 10,000 feet above the level of the sea, and has been running continuously ever since, and at times over ten 1/2" Bellise drills. The steam cylinders were connected to an independent Jet Condenser, for which we are using the mine water, and the resultant economy of operation is very noticeable.

The operation of this Compressor is as near perfect as that of any machine we have ever seen, and this type is well worth the extra cost on account of the great permanent economy in operation.

Our mine is equipped exclusively with your drills and we have only the highest words of praise to give them.

Yours very truly, The Portland Gold Mining Co.,
Jas. A. Burns, President

INCORPORATED MINES PAYING DIVIDENDS.

	NAMES OF MINES	LOCATION	No. of Shares	Capital Stock	Par Value	Amount of last Dividend	Date of Last Dividend	Total Amount Paid in Dividends	Kind of Minerals Produced
1	Aetna Cons.	California	100,000	\$ 500,000	\$ 5	\$ 10	Oct 1898	\$ 150,000	Q.
2	Alaska, Treadwell	Alaska	200,000	5,000,000	25	37½	July 1898	3,550,000	G.
3	Alaska Mexican	Alaska	200,000	1,000,000	5	10	July 1898	299,031	G.
4	Alice	Montana	400,000	10,000,000	25	05	April 1898	1,075,000	G. S.
5	Alice	Utah	400,000	10,000,000	25	05	Sept 1898	2,525,000	S. L., G.
6	Anaconda	Montana	1,200,000	30,000,000	25	1 25	May 1898	6,750,000	C.
7	Anchoria Leland	Colorado	600,000	600,000	1	01	Aug 1898	150,000	G.
8	American Gold	Colorado	300,000	3,000,000	10	05	Sept 1898	336,000	G. S. L.
9	Atlantic	Michigan	40,000	1,000,000	25	1 00	Feb. 1898	75,000	G.
10	Bald Butte	Montana	250,000	250,000	1	03	Sept 1897	512,500	G. C. S.
11	Big Six	Colorado	500,000	500,000	1	00½	May 1898	15,000	G. S.
12	Boston & Montana	Montana	150,000	3,750,000	25	5 00	Aug 1898	8,375,000	G. C. S.
13	Bullion Beck and Champion	Utah	100,000	1,000,000	10	10	Sept 1898	2,525,000	G. S.
14	Bunker Hill and Sullivan	Idaho	300,000	3,000,000	10	07	Sept 1898	537,000	S. L.
15	Cariboo	British Col.	801,000	800,000	1	02	July 1898	220,965	G.
16	Calumet & Hecla	Michigan	10,000	2,500,000	25	10 00	Sept 1898	54,850,000	C.
17	Centennial Eureka	Utah	30,000	1,500,000	50	1 00	Mar 1897	2,010,000	S. L.
18	Central Lead	Missouri	10,000	1,000,000	100	1 00	Sept 1898	66,980	L.
19	Champion	California	34,000	340,000	10	25	April 1898	296,200	G.
20	Charleston	S. Carolina	10,000	1,000,000	100	1 50	Sept 1898	165,000	
21	Chloride Point	Utah	500,000	500,000	1	01	Dec. 1897	5,000	G. S.
22	Colorado Smelting	Montana	100,000	1,000,000	10	50	July 1898	1,595,000	G. S. C.
23	Crescent	Utah	24,000	600,000	25		July 1897	280,000	
24	Crowned King	Arizona	600,000	6,000,000	10	02	Aug 1894	184,000	G. S. L.
25	Daly	Utah	150,000	3,000,000	20	25	Mar 1897	2,925,000	S. L.
26	Deadwood Terra	S. Dakota	200,000	5,000,000	25	05	May 1898	1,350,000	G.
27	De Lamar	Idaho	400,000	2,000,000	5	29	May 1898	2,451,600	S. L.
28	Elkton Consolidated	Colorado	1,250,000	1,250,000	1	01½	Sept 1898	616,961	G. S.
29	El Paso	Colorado	650,000	650,000	1	01	Jan 1894	12,093	G. S.
30	Empire State	Idaho	75,000	750,000	10	10	Aug 1898	15,000	
31	Fern	British Col.	200,000	200,000	1	05	Jan 1898	10,000	
32	Florence	Montana	500,000	2,500,000	5	01	May 1897	132,530	S.
33	Geyser-Marion	Utah	300,000	1,500,000	5	02	Sept 1898	96,000	G.
34	Gold Coin of Victor	Colorado	1,000,000	1,000,000	1	01	Sept 1898	110,000	G.
35	Golden Cycle	Colorado	21,000	1,000,000	5	00½	Aug 1898	155,000	
36	Gold Coin	Colorado	200,000	1,000,000	5	05	Nov 1897	160,000	G. S.
37	Gold and Globe	Colorado	750,000	750,000	1	3-10	July 1897	51,625	G.
38	Golden Reward	S. Dakota		1,030,000		15	Feb 1893	155,000	G.
39	Grand Central	Utah	250,000	250,000	1	12½	Sept 1898	125,000	G. S. C. L.
40	Hecla Consolidated	Montana	30,000	1,500,000	50	50	Feb 1897	2,175,000	G. S. L. C.
41	Highland	S. Dakota	100,000	10,000,000	100	20	Sept 1898	3,724,718	G.
42	Holy Terror	S. Dakota	300,000	300,000	1	03	Aug 1898	108,000	G.
43	Homestake	S. Dakota	125,000	12,500,000	100	50	Sept 1898	6,993,750	G.
44	Hope	Montana	100,000	1,000,000	10	10	Mar 1898	762,252	S.
45	Horn Silver	Utah	400,000	10,000,000	25	05	Sept 1898	5,210,000	S. L.
46	Idaho	British Col.	500,000	500,000	1	05	May 1898	264,000	
47	Iowa	Colorado	1,000,000	1,000,000	1	00½	June 1898	90,000	G.
48	Iron Mountain	Montana	500,000	5,000,000	10	1 00	Jan 1898	501,100	S.
49	Isabella	Colorado	2,250,000	2,250,000	1	00½	June 1897	270,000	G.
50	Kearsarge	Michigan	40,000	1,000,000	25	10	Aug 1897	160,000	C.
51	Kennedy	California	100,000	10,000,000	100	48	Aug 1898	1,796,000	G.
52	Last Chance	British Col.	500,000	500,000	1	04	Jan 1897	42,000	S. L.
53	Le Roi	British Col.	500,000	2,500,000	5	10	Apr 1898	775,000	G.
54	Lillie	Colorado	1,000,000	1,000,000	1	01	Sept 1898	134,110	G.
55	Minnesota	Minnesota	185,000	18,500,000	100	1 50	Oct 1898	4,735,000	L.
56	Montana Ltd.	Montana	660,000	3,300,000	5	05½	May 1898	2,997,557	G. S.
57	Montana Ore Purchasing	Montana	40,000	1,000,000	25	1 00	July 1898	760,000	
58	Morning Star	California	2,400	240,000	100	5 00	June 1898	666,600	G.
59	Mt. Rosa	Colorado	1,000,000	1,000,000	1	02	Jan 1898	60,000	G.
60	Mercur	Utah	200,000	5,000,000	25	12½	Sept 1898	1,166,000	G.
61	Mammoth	Utah	400,000	10,000,000	25	05	Sept 1898	1,310,000	G. S. C. L.
62	Moon Anchor Gold	Colorado	600,000	600,000	1	07½	Aug 1898	216,000	G.
63	New York & Hon. Rosario	Central A.	150,000	1,500,000	10	10	July 1898	930,000	S. G.
64	Napa	California	100,000	700,000	7	20	Oct 1898	950,000	Q.
65	New Idria Quicksilver	California	100,000	500,000	5	20	Sept 1898	30,000	Q.
66	Ontario	Utah	150,000	15,000,000	100	75	Dec. 1897	13,542,500	S. L.
67	Osceola	Michigan	50,000	1,250,000	25	1 00	June 1898	2,273,500	C.
68	Parrot	Montana	230,000	2,300,000	10	30	July 1898	2,000,898	C.
69	Pennsylvania Consolidated	California	51,500	5,150,000	10	05	Aug 1898	43,925	
70	Pioneer	California	100,000	1,000,000	10	12½	Aug 1898	37,500	G.
71	Portland	Colorado	3,000,000	3,000,000	1	02	Aug 1898	1,597,080	G. S.
72	Princess	Colorado	1,000,000	1,000,000	1	00½	Feb 1897	45,000	G.
73	Quincy	Idaho	100,000	2,500,000	25	3 50	Aug 1898	10,120,000	C.
74	Rambler-Cariboo	British Col.	1,000,000	1,000,000	1	02	April 1897	40,000	
75	Raven	Colorado	1,500,000	1,500,000	1	01	March 1898	20,000	G.
76	Reco	British Col.	1,000,000	1,000,000	1	10	Jan 1898	287,500	S. L.
77	Republic	Washington	1,000,000	1,000,000	1	03	Oct 1898	30,000	G.
78	Sacramento	Utah	1,000,000	5,000,000	5	00½	Sept 1898	57,000	G.
79	Santa Rosalia	California	100,000	100,000	1	10	Feb. 1898	125,000	G. S.
80	Small Hopes Consolidated	Colorado	250,000	5,000,000	20	10	June 1898	3,300,000	S.
81	South Swansea	Utah	150,000	150,000	1	05	Oct 1898	125,000	S. L.
82	Standard	California	200,000	20,000,000	100	10	Aug 1898	5,674,940	G. S.
83	St. Joseph	Missouri	30,000	3,000,000	10	1 50	Sept 1898	2,747,000	L.
84	Silver King	Utah	150,000	3,000,000	20	25	Sept 1898	1,687,000	S. L. G.
85	Slocan Star	British Col.	2,000,000	1,000,000	0.50	05	Mar 1897	350,000	
86	Smuggler	Colorado	1,000,000	1,000,000	1	01	June 1898	1,035,000	S. L. Z.
87	Swansea	Utah	100,000	500,000	5	05	Sept 1898	116,500	S. L.
88	Tom Boy	Colorado	200,000	2,000,000	10	10	Dec 1896	600,000	G.
89	Tamarack	Michigan	60,000	1,500,000	15	3 00	June 1898	5,330,000	C.
90	Union	Colorado	1,250,000	1,250,000	1	01	June 1896	73,000	S.
91	Victor	Colorado	200,000	1,000,000	5	50	Sept 1898	1,055,000	G.
92	Vindicator	Colorado	1,500,000	1,500,000	1	05	July 1898	76,125	G.
93	Western Mine Enterprise	Montana	500,000	500,000	1	20	Jan 1898	48,680	
94	War Eagle	British Col.	2,000,000	2,000,000	1	01½	Sept 1898	239,000	
95	Wolverine	Michigan	60,000	1,500,000	25	1 00	Oct 1898	60,000	C.
96	White Water	British Col.	125,000	625,000	5	32	April 1898	194,000	
97	Yellow Aster	California	100,000	1,000,000	10	03½	Aug 1898	118,789	G.

B, Silver.

G, Gold.

L, Lead.

O, Copper.

Q, Quicksilver.

I, Iron.

Z, Zinc.

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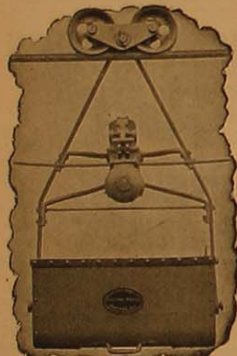
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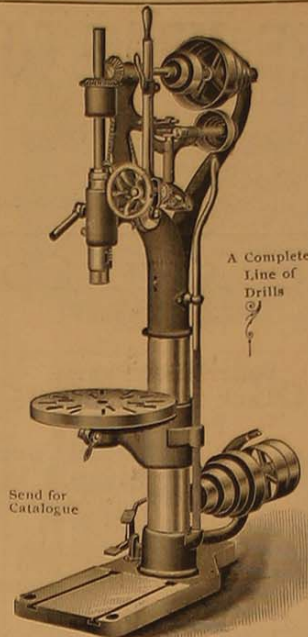
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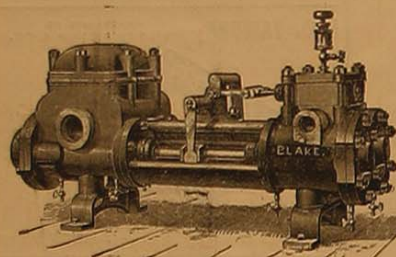
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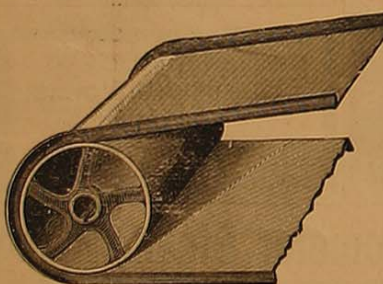
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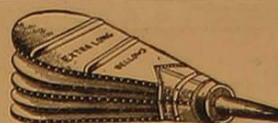
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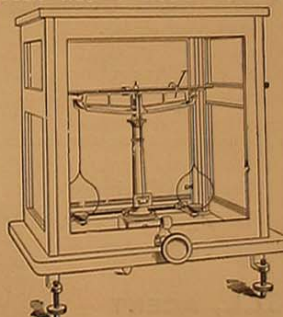
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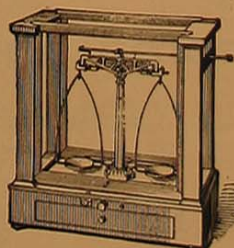
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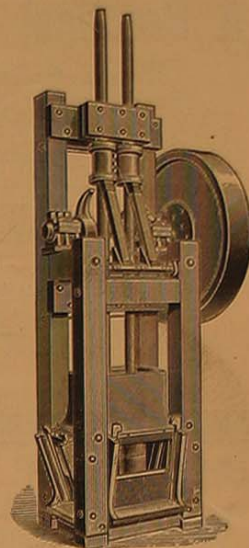


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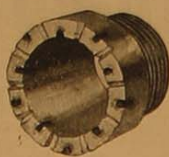
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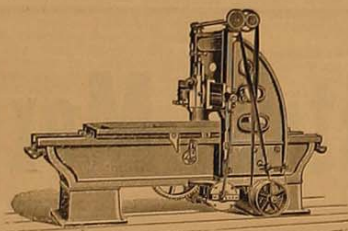
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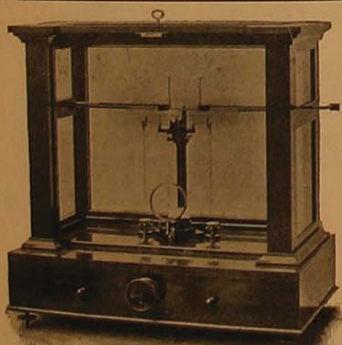
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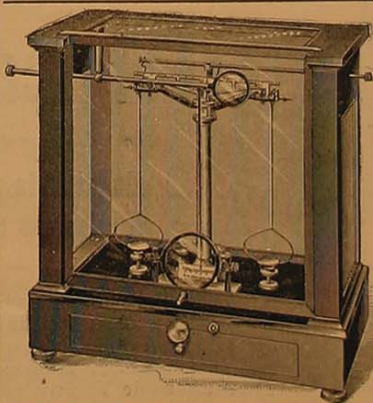
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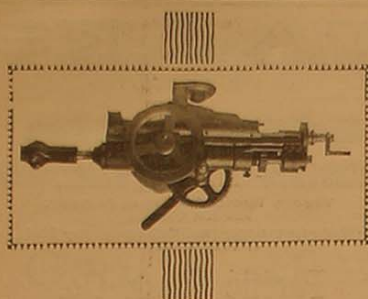
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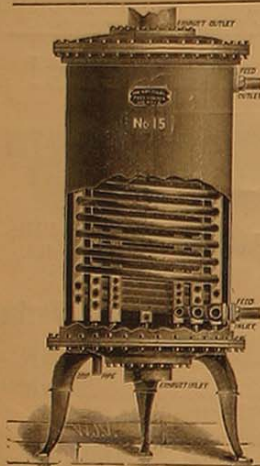
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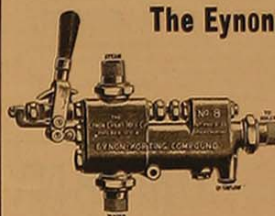
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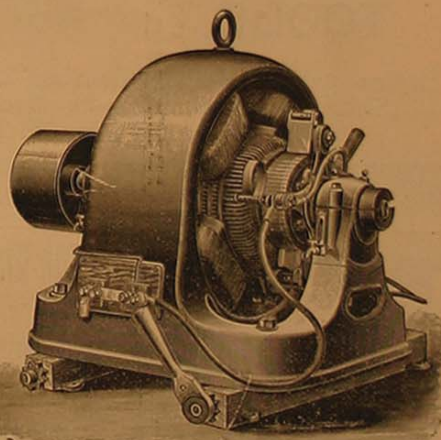
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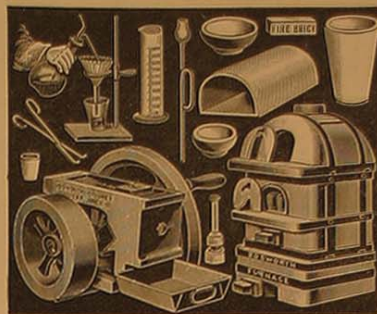
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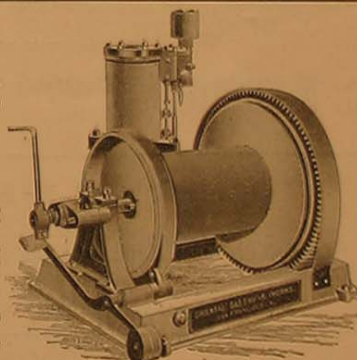
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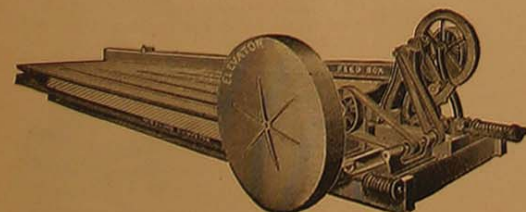
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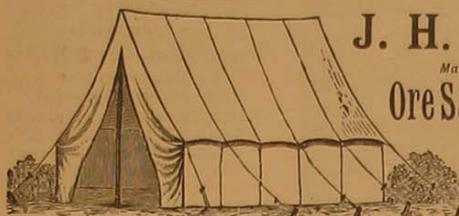
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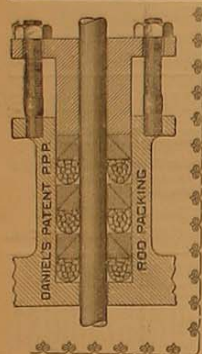
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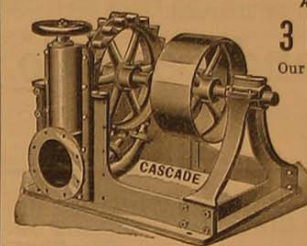
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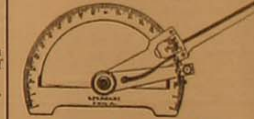
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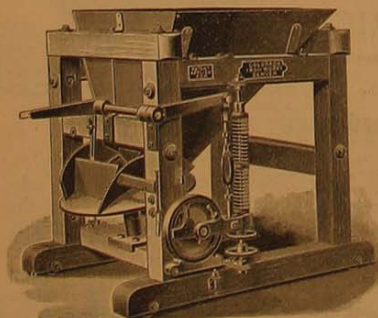


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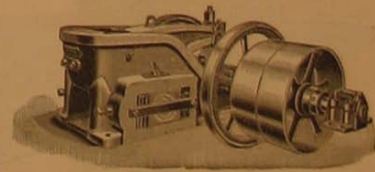
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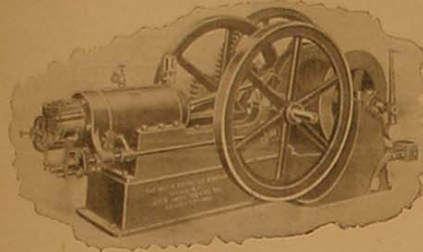
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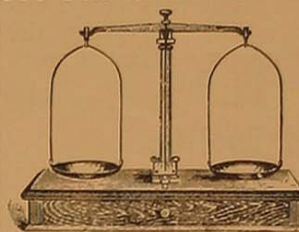
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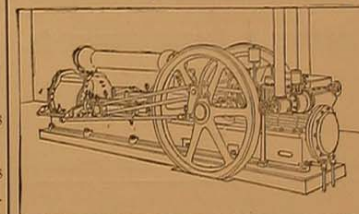
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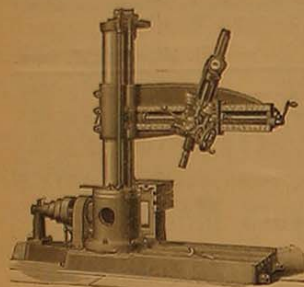
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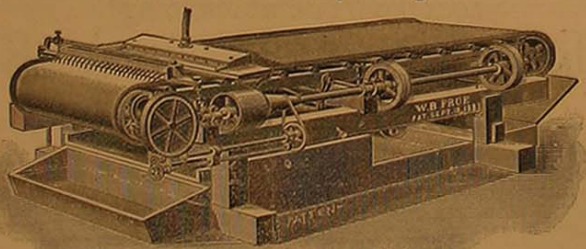
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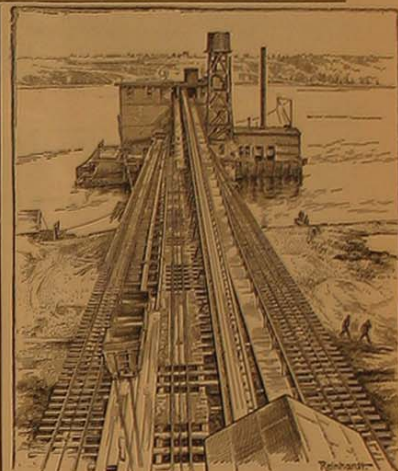
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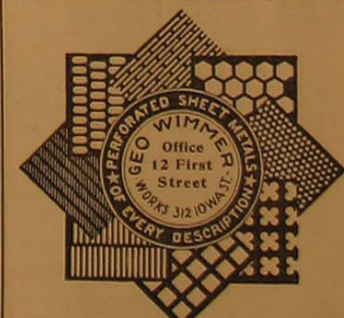
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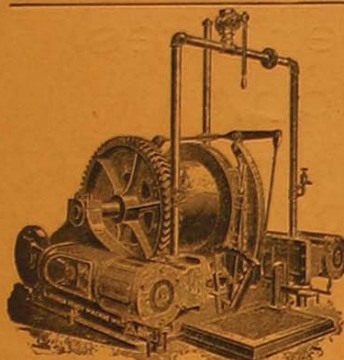
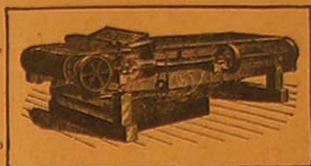
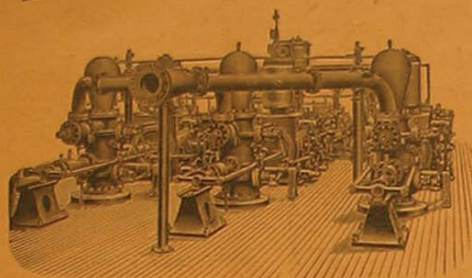
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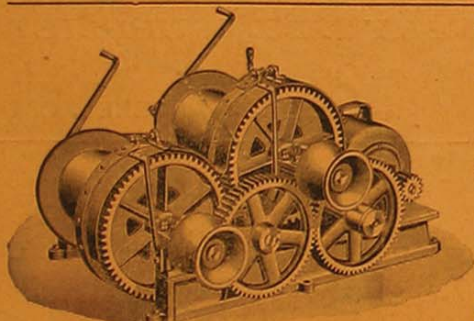
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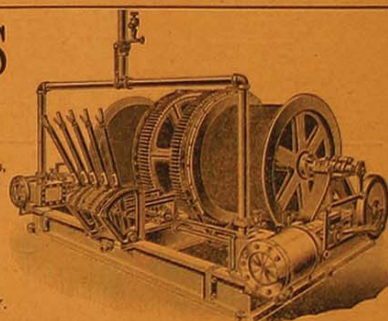
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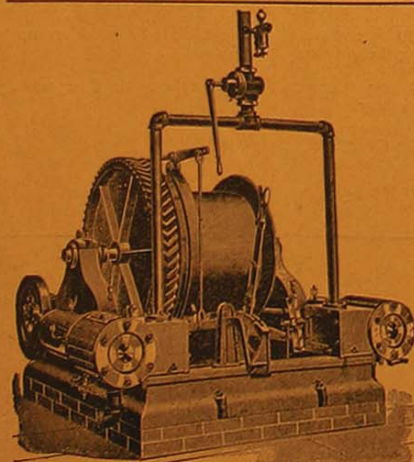
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